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On the Combustion of Powdered Fuel in Revolving Furnaces and Its Application to Heating and Puddling Purposes.*

BY MR. T. R. CRAMPTON.

From the earliest period it has been the desire of all parties interested in the use of coal, to produce perfect combustion and avoid smoke. Various mechanical means for bringing together, in a regular manner, the proper equivalents of air and coal, and for keeping the bars clean, have been suggested to effect this purpose; but none, so far as I am aware, have hitherto perfectly succeeded, particularly when large quantities of coal have to be burnt in a small space.

Members of the Institute are fully aware, in many of the operations of heating and melting metals, of the importance of regularity in the heat produced, particularly in some chemical operations, and in many cases the total quantity of heat capable of being generated by the combustion of cold air and coal is only slightly in excess of that necessary to heat or melt the material under treatment, and any irregularity in this respect would be fatal to the operation. These difficulties have naturally presented themselves to all those who may have investigated the subject, and it appeared to me that the only way to insure perfect combustion is to pow'er the fuel, and feed it regularly together wi' air by mechanical means without the bars, so as to be independent of natural drafts, which from various causes is always a source of irregularity.

It is not only necessary to have the means of bringing together at will the proper equivalents of air and coal to insure perfect combustion, but it is essential that the size of the coal should be determined; and should during its flotation through the furnace be so conducted that any overcharged and undercharged currents of air and coal should be continually reintermixed until the whole of the carbon is consumed; otherwise, were not this attended to, there would be deposits of coal on one part of the furnace and free oxygen on others, and without due attention to these points proper results could not be attained.

It was discovered, at times, that although an absolute mixture entered the pipes in the first instance, conveying the coal and air to the furnace, that under certain circumstances they separated, and more particularly where they had to pass through bends, the superior momentum of the coal causing it to be carried on the outside of the bend, and issuing from it into the furnace in an unmixed state. In the fixed combustion chamber experiments it was arranged to have several inlets of the mixture so placed as to impinge into each other on the bottom, as shown in Figs. 1 and 2, and readmixture was the result. An ordinary air injector, worked by a fan (see Fig. 3), was used for introducing the fuel.

Various forms of furnaces have been experimented upon; that which was found the most simple is shown in Figs. 1 and 2, where a separate combustion chamber is used, the fuel and air playing on the bottom surface, passing over a bridge into the utilizing chamber.

To ascertain the best grinding machinery various known implements were employed; the common flour-mill apparatus (worked by ordinary millers), both for grinding and conveying the coal to its destination, is the most simple, involving no new kind of labor or machinery. The ordinary common Derbyshire grit stone is the best adapted for the purpose. Coal to pass through a 30 sieve can be ground at an expense for labor of 6d. per ton, and, with proper and ordinary appliances, 30 or 40 tons a day could be manipulated, at a cost of 1/ per ton, including all charges, such as interest on capital, sinking fund, wear and tear, and labor.

The feeding apparatus for the coal was a great difficulty, the requirements being that the machine must be regular in its action, whether the coal be wet or dry. Nevertheless, after very many failures, the machine to be described proved perfectly successful, requiring no particular attention for months. I do not describe these various experimental machines, but only that shown on the drawing, which is most effective. Figs. 4 and 5 show the feeder, worked by a belt on a drum, which communicates motion to the stirrers and rollers by suitable gearing. A is a hopper, with vertical sides; B a strainer, for the purpose of preventing large particles of matter entering the hopper; C, D are stirrers, disturbing nearly the whole lower area of the fuel, and revolving in the direction of the arrow, thereby forcing the powdered fuel through the opening, E, regulated by the sliding door, F, the top of the opening, E, being kept below the top of the box, G, so that the fuel, entering E, is not forced over the edge of the box. Should the box become full of fuel, by reason of the rollers not taking it away as quickly as it is supplied to the box, the stirrers not having sufficient force to increase the hight of the fuel in it, the stirrers will continue to revolve and agitate the fuel, until the rollers have reduced the quantity in the box. The rollers, H, I, are for the purpose of feeding the fuel into the shoot, K, conducting it to an injector, the inlet of a fan or other position required, the quantity being regulated by varying the distance between the rollers, H, I, by means of a regulating screw, L, acting upon the lever, N, to which are attached the bearings of the roller, H.

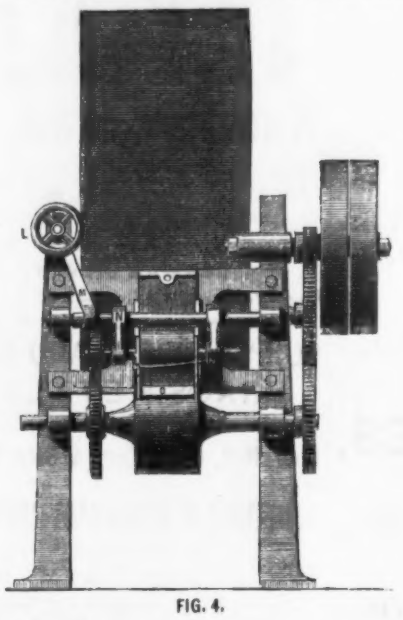

FIG. 4.

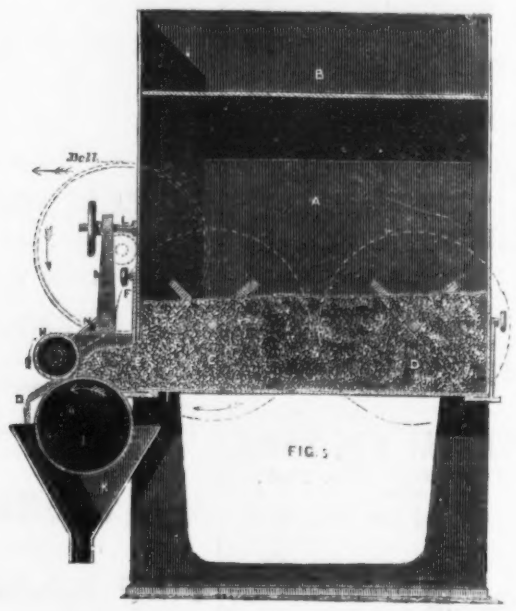

FIG. 5.

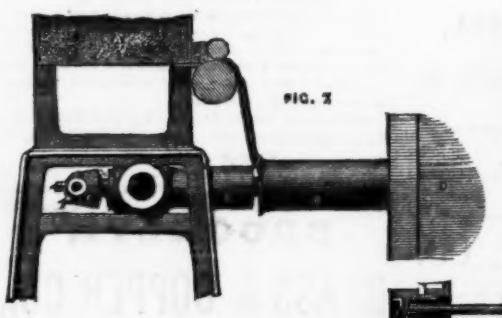

FIG. 7

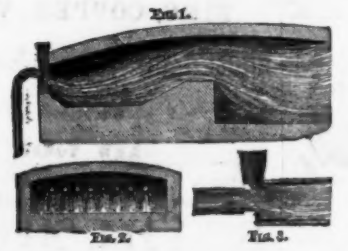

Fig. 1.

Fig. 2. Fig. 3.

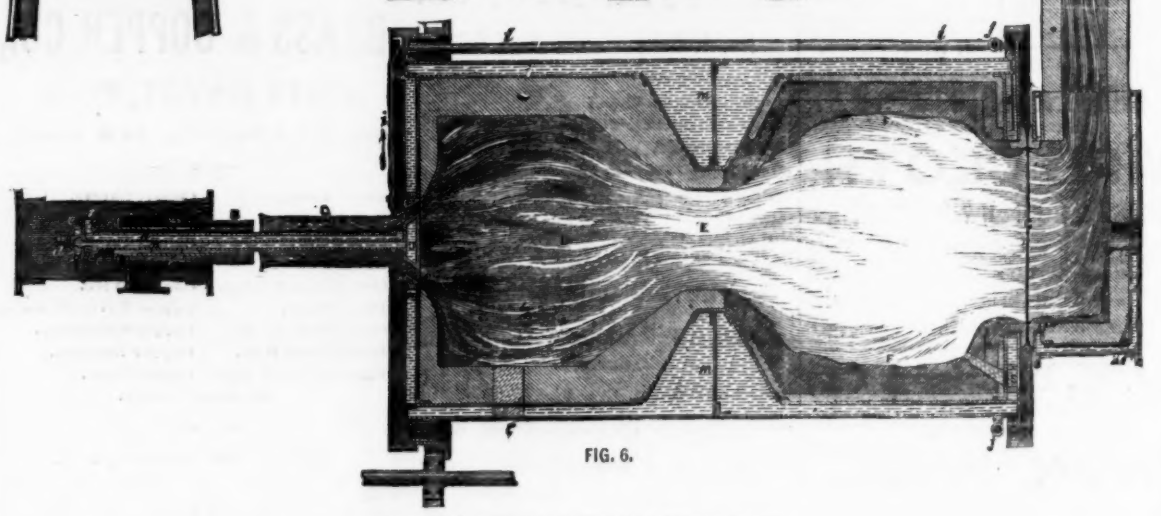

FIG. 6.

CRAMPTON'S SYSTEM OF BURNING POWDERED FUEL.

One of the rollers, H, I, should be a roller of small diameter, by preference about 4 or 5 in. As the rollers take away the fuel from the box, G, it is continuously replenished by that forced into it by the stirrers, D, the effect being that the fuel in the box, and in contact with the rollers is kept in a comparatively loose state, and a compartively uniform pressure, whatever the hight of the fuel in the hopper, A, may be. The position of the rollers, one above the other, enables the entire action to be in view, whereby any irregularity in the feed passing over the scraper, O, can be immediately detected and the cause ascertained, a most important consideration, as any irregularity of the fuel passing to the furnace causes a variation in the heat, and produces bad effects. The roller, H, may be placed at the side of the roller, C, having a shallow box over both of them into which the stirrers force the fuel, but in this case the fuel would fall underneath, and be more hidden from view than when the rollers are one above the other, and although they would act, I prefer the rollers one above the other, and kept fed by a very small head of fuel. This small and constant head of fuel between or on the rollers can be maintained in various ways, without a hopper being attached to each pair of rollers, and also many feed rollers at distances apart from each other can be supplied by an ordinary screw, as used for conveying flour, or by other suitable means.

It was ascertained that from the intense heat produced and from other causes, there was rapid wear and tear of the brickwork; but I observed that where the natural slag was formed at those points the bricks were protected.

The object then was to endeavor to consume as much as possible in contact with such slag. The combustion chamber was then so constructed as to allow the coal and air to play on to an extended bed, formed by the said slag, conducting the unconsumed products as much as possible over the work to be heated and without touching the brickwork.

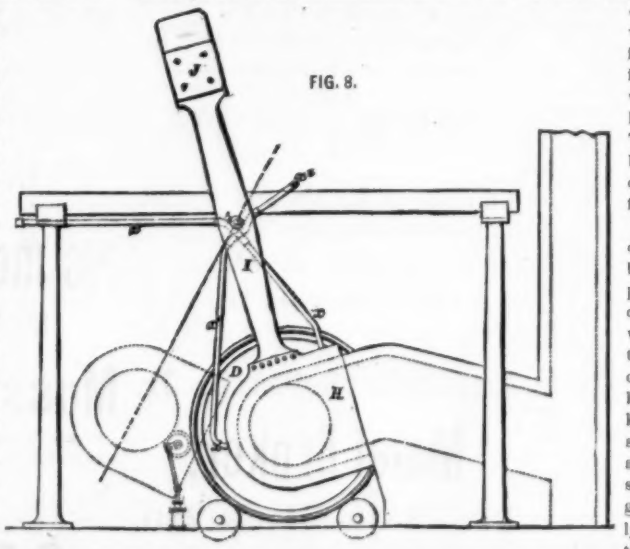

FIG. 8.

To show the effect produced under such conditions, the combustion was so perfect and regular, that cold scrap was welded with 5 to 6 cwt. of coal to the ton of iron, and this with cold air, and without utilizing the heat in the chimney. What the result would be if we used the waste heat, the members can form their own opinion. I am not aware of any system, whether by heated air or otherwise, by which iron has been welded with so small a quantity of coal. The reason is obvious, the temperature is maintained by the perfect combustion of the air and coal without variation. In other cases steel of the ordinary kind was melted in 1¾ hours; in other instances, 60 lbs. of pure wrought iron scrap was melted in 3½ hours without any admixture of any kind; a sample of this is shown. This, I believe, has never before been accomplish with cold air and coal; but of course it can be effected by the regenerative furnace.

This is an evidence of the extraordinary perfection of the combustion, since the theoretical heat producible is only in small excess of that of the melting point of wrought iron, and had any variation of the quantities of air and coal occurred, this result would have been nearly impossible. I know of no furnace possessing the same power of regulating the heat as in this. It could hardly be surpassed even by using weighted gasometers, containing respectively air and gas, and passing them through regulated openings to the furnace, and impinging into each other.

Another experiment was made in a large marine boiler; taking out the firebars, and lining the furnace with brickwork, and injecting the air and coal into them; the boiler containing about 1500 feet of surface.

In a 24 hours' trial, the variation in the temperature of the smokebox did not exceed 20°, that is, between 380 and 400, as we found no difficulty in evaporating 10 to 11 lbs. of water, with 1 lb. of fuel. It is impossible to produce smoke, as the whole of the volatile matter is consumed in the first instance. The consequence is, that the uptake of boilers have no flame in them, an important element when superheating steam, as superheaters would not, under such conditions, be exposed as at present to a variation of temperature, which, in many instances, prohibits their use.

In steamships the fuel would be ground on board, and conveyed to the furnace mechanically, requiring no stokers; and, whatever the length of the voyage, the coal consumed per hour may be a constant quantity.

From observations made, I believe that from the regularity of the heat three-fourths of the surface usually employed would produce the same amount of steam. The only residue will be slag in the furnace, which would be tapped out from time to time, requiring a few minutes for the operation.

Upon further investigation on this subject, it was deemed to be a great improvement to form a revolving combustion chamber, and in working it out (at the gun factories at Woolwich, under the charge of Col. Campbell), there was attached to it a puddling chamber revolving together, the whole being encased in water. The description is as follows:

Figs. 6 and 7 represent an elevation and a longitudinal horizontal section of combustion chamber and utilizing chamber revolving together.

A is a feeder for pulverized coal, the coal dropping into the induced current of air produced by the injections of air through a fixed annular pipe, B, the injected air, coal dust and induced air passing together through the annular pipe, C, attached to the revolving chamber, striking the revolving chamber, D (which has been previously heated with wood or ordinary coal in the usual manner employed in coal dust furnaces), at an angle, passing along the sides, and is deflected all round into the center, E, where a most intimate readmixture of the products takes place close to, or in, the working or puddling chamber, F, passing through and out of it in the opening, G, into the flue-piece, H, and thence to the chimney. The flue-piece, H, is shown attached to the lever, I, Fig. 8, with a counter-weight, J, at the other end.

This flue-piece is removed away from the furnace, as shown by the dotted lines, when the furnace has to be charged, or discharged, or refettled, or otherwise when free access is required to the chamber. The flue is kept to its face by any convenient means. The flue-piece is shown made double of iron, forming a water space, and supplied by the waste water from the furnace; it may be supplied by any other convenient means, but that shown is simple. The water enters through a cock, or revolving union joint, or short piece of hose attached to a pipe fixed in a line of the center of the flue lever, I, connected with another pipe fixed on the flue-piece, the water passing through these pipes into the flue-piece, whatever its position. The water leaves the flue-piece by a pipe, X.

The water spaces surrounding the furnace are supplied as follows (see Figs. 6 and 7): A bearing or cock, *d*, is attached to the revolving chamber at any convenient distance from its end, in line with its axis on which it turns, revolving in a fixed shell, *e*. The water enters at *f* into an annular space, *g*, in the shell; from this space it passes through a passage, *h*, in the revolving portion through the annular air and coal passage, *c*, along the pipe, *i i*, into a pipe, *j*, surrounding the furnace; from thence through one or more pipes, *k k*, passing close into the neck of the furnace, *l*. The water traverses the water space, past the center portion, *m*, making its exit through *n*, and then by a passage made through the annular coal and air passage, *c*, into the center, *o*, then through the passage, *p*, into the annular recess, g^1, in the shell, and finally out of the pipe, *r*. The end of the pipe, *r*, may be carried up to a hight above the furnace, so that the water spaces may be full in case of accident to the supply; the waste water may be made to pass by suitable connections, X^1, to the water space in the flue-piece if desired.

In some cases the direction of the water may be reversed by changing the outlet, *r*, into the inlet, *f*, and *vice versa*. If this be arranged, the water may be allowed to make its exit at any convenient point from openings made in the pipes, *i i* and *j*, or at other convenient position, falling into channels near the ground; also, if the latter plan be used, a simple revolving union joint with a single pipe connecting it to the chamber at *o* may be used in substitution of the cock or bearing, *d*, and its double connection, *h p*, to the furnace.

Any convenient mode may be adopted for causing the water to pass into the water spaces of the combustion chamber, so that the main feature of its passing centrally through a cock, bearing, or union joint be maintained as mentioned; also the form of water spaces in the

* Read before the Iron and Steel Institute, May 1, 1873. Engravings from *Engineering*.

furnace so supplied with water may be varied; but if any parts of the furnace be left without water protection, it is desirable that the extreme ends and projections into the furnace should have water spaces for keeping them cool.

Instead of the furnace being made double, forming a continuous water space, it may be constructed in part or in whole of a single shell or frame of iron, or other suitable material, and protected by a coil, or number of pipes placed inside or outside the casing, or part inside and part outside, such pipes being in connection with the cock, bearing, or union joint before alluded to, the water passing through the same, and thence through the pipes, making its exit substantially as previously described. The combustion chamber is by preference lined with fire brick, gannister, or other suitable refractory material, and secured in its place by any well known means; the puddling part of the chamber to be lined and fettled by any material, and in the manner commonly known to be applicable to that purpose. When coils or pipes are used the refractory lining or fettling may be made to surround such pipes or coils; *s* and *t* are tap holes for drawing off the cinder and slag when required.

The mixed coal and air is described as passing into the combustion chamber through an annular space striking the chamber all round. Instead of this annular space any convenient number of pipes may be substituted; and instead of the mixture of air and coal being arranged to enter the chamber equally all round, in some cases the air may enter equally, but the coal may be so adjusted on its entering the induced current that the mass of the coal may enter more at one side than the other, say, on the bottom, and passing along the revolving chamber, the products will be deflected upward, and as the top air passing on the upper side will be deflected downward in an intensely heated state, a readmixture of the whole will be made at or near the entrance of the working chamber, producing most intense heat in the utilizing chamber. Where the material under treatment will not be injured by the direct combustion of the air and coal, the combustion chamber may form the utilizing chamber.

Slag is continually formed, which will have to be drawn off every 12 hours, or at any time it may be required to do so. Some of the slag in the combustion chamber will be carried round with the furnace, forming a continuous slag lining, thereby protecting the combustion chamber from the injurious action of the air and coal, which would otherwise strike directly on it.

When the revolving combustion chamber is used in combination with a fixed working chamber, I prefer that that portion of the working chamber, forming the joint between it and the revolving chamber, should have a water casing. The revolving combustion chamber constructed on the principle above described may be readily adapted so as to be applied to boilers, or any description of furnace to which it is applicable.

The furnace in action is that described with a double water casing; the effect is all that can be desired; it weighs nearly 20 tons, and is worked with two small cylinders 5 in. diameter by 10 in. stroke, and its action is perfectly noiseless, and there is no part of it on the outside at any period that you cannot conveniently lay your hand on.

The effect of this equal temperature is not only a great protection to the furnace itself, but assists materially in retaining the fettling and brickwork, since they are not subject to changes of temperature. Although the furnace is perfectly smooth in the inside, and lined with only 1½ in. of ordinary fire-brick, the fettling being melted upon it, this has not in any case broken away, although it is constantly worked to within an inch of the brick lining; neither is an effect produced on the furnace by heating it up and cooling it rapidly; it can be heated from cold to a welding heat in 1¼ hours. The heat can suddenly be stopped and cold air blown into the furnace, cooling it as rapidly as possible without any injurious effect upon the furnace or the lining. Perhaps to no more severe test could it be subjected.

We only puddle 5 or 6 cwt. charges of iron, and eight charges are worked in one shift of 12 hours, melting the iron in it, the gain in yield being from 5 to 10 per cent.

The quality of iron produced, as compared with the ordinary puddling, using the same pig, is somewhat remarkable.

From the ordinary furnace the iron, after being puddled and welded three times, bears 22 tons tension to the inch. In this furnace the puddled ball, reheated and rolled once out, broke at never less than 23 tons to the inch, but we have produced (and I believe we can regulate at will) puddled iron heated and rolled once, sustaining a tensile strain of from 26 to 28 tons to the inch, and when hardened, from 38 to 45 tons to the inch respectively; and this result, I anticipate, may be realized in practice as may be required, but this question has to be further investigated. The furnace we have at work could be make to puddle 12 to 15 cwt. per charge if desired. My impression is that it would be more economical to have furnaces with a capacity for working 25 to 30 cwt. charges.

A separate furnace for melting has been erected, but it has not as yet been regularly worked.

The refettling is of the most simple character. After the heat is discharged a certain amount of cinder is allowed to remain, and small pieces of mill tap are placed on an incline at the ends, and the cinder splashed over it. Then a further quantity of mill tap is thrown all over the bottom, the cinder, just covering it, leaving it quite smooth on the surface; this rapidly cools, after which the next heat is charged. The refettling takes place after each heat, and is done in sections.

We naturally anticipated that this old cinder being left in the furnace would deteriorate the quality of the iron, but we have broken very many samples, and cannot discover the slightest deterioration. This is a matter of some importance, and requires further investigation, both mechanically and chemically.

It will be perceived that in this arrangement the coal is supplied from the mill to the hopper, and that the handles regulating the supply of the air and coal, together with those for manipulating the furnace engine, may be placed near the mouth of the furnace, and the whole worked by the two men in charge, assistance only being required when the furnace is discharged.

One man is required to grind the coal for one furnace, but three men could do the work for six or eight furnaces.

Particular account has not been taken of the fuel consumed, as we do not work night and day, neither are we using sufficient weight of charge for effecting the greatest economy. At the same time I see no reason why one ton should not be puddled with from 12 to 15 cwt. of coal.

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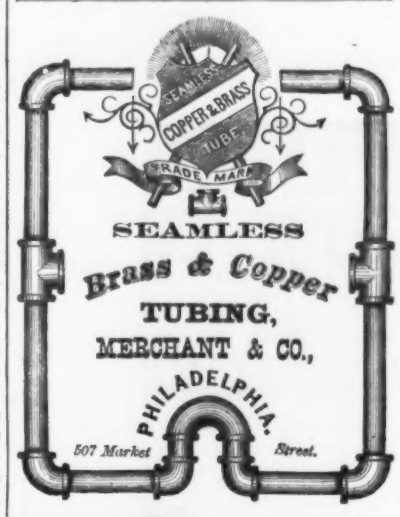

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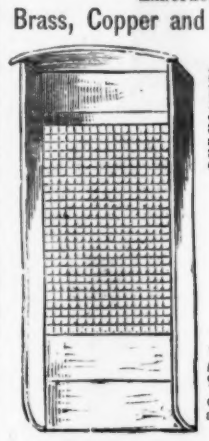

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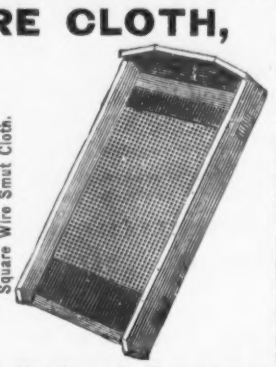

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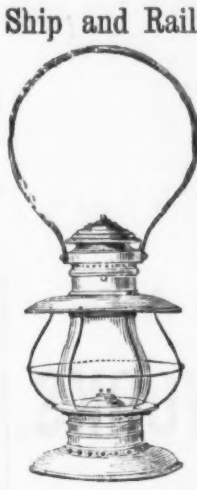

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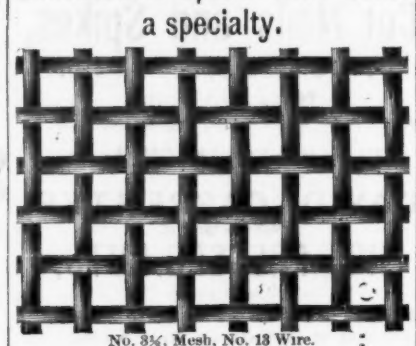

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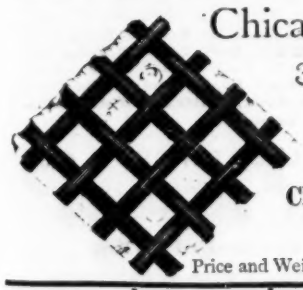

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10	3.47	40	11	3.20	38	12	2.80	35	14	2.43	33	16	2.00	30	18	1.39	30
11	2.75	32	12	2.45	31	13	2.15	30	15	1.97	30	17	1.47	25	19	1.08	25
12	2.10	26	13	1.85	25	14	1.62	25	16	1.51	25	18	1.11	20	20	0.76	20
13	1.61	22	14	1.41	20	15	1.31	21	17	1.10	20	19	0.85	18			

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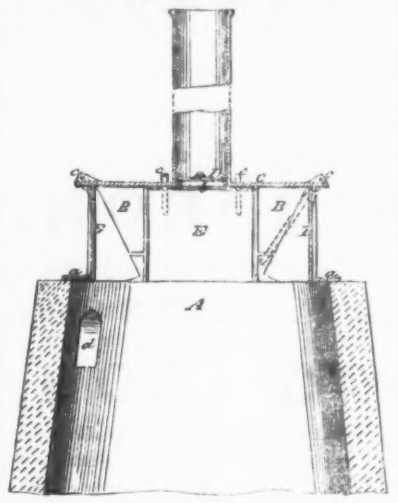
New Patents.

We take from the records of the patent office at Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN FURNACES FOR SMELTING IRON AND OTHER ORES.

Specification forming part of Letters Patent No. 123,894, dated February 20, 1872; reissue No. 5397, dated May 6, 1873, to Samuel W. Harris, of Hudson, New York.

This invention relates to blast furnaces in which a hot blast is used. It has for one of its objects the economy of the gases evolved in the smelting process, and their conduct in a cold dead state, by proper channels, to any desired place or places where they are to be used for heating the pipe ovens or steam boilers, or for illuminating and other purposes. Its other objects are, economy of fuel, increased production and improved quality of the metal and the regulation of its quality, and increased durability of the upper part of the furnace. The improvement consists in providing the top of the furnace, above an opening or openings provided for the exit of the gases to the place or places where they are to be utilized, with a



IMPROVEMENT IN SMELTING FURNACE.—*Fig.* 1.

cover having one or more charging apertures for the introduction of the ore, fuel, and flux into the furnace, and with swinging doors for closing the said aperture or apertures, and thereby preventing the escape of the gases by said aperture or apertures after charging, such cover being also provided with an opening of suitable size for the escape of any surplus gas, with a damper to regulate such escape.

As the invention is more particularly applicable to blast furnaces for the smelting of iron ores, it will be more particularly described with reference to the smelting of those ores, though its mode of application would be the same for the smelting of other ores.

Fig. 1 is a central vertical section of the upper part of an ordinary blast furnace, having the invention in one of its forms or modifications applied. Fig. 2 is a plan of the same.

A represents the upper part of the blast furnace, and *a* the treenail head plate. On that plate, at the edge of the furnace mouth, there are erected iron stanchions B B, which support an iron plate, C, made in one or more pieces, of polygonal form, and in the center of which is

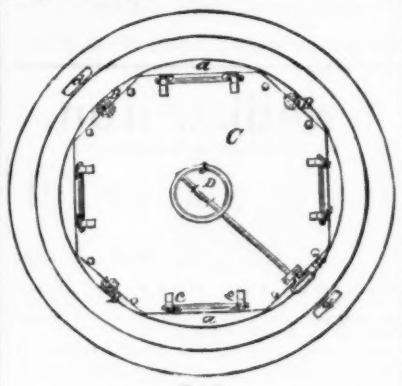


Fig. 2.

an opening, *b*, fitted with a damper, D. Between the stanchions B B are iron doors or shutters E E, hung on hinges *c c* at their upper edges from the above mentioned plate C, such doors resting, when in place, against the interior surfaces of the stanchions, at or close to the edges thereof, and thereby effectually serving to close the spaces between the stanchions.

The stanchions, the top plate, the hinged doors, and the damper form a complete cover, closing the mouth of the furnace, but having openings capable of being easily exposed for introduction of the ore, fuel, or flux into the furnace, and which are closed after charging to prevent escape of the gases by them. At a short distance below this cover there are provided in the sides of the furnace one or more openings, *d d*, whence the gases from the furnace are conducted by ducts to the place or places where they are to be used.

In charging the furnace with fuel, ore, or flux, the barrow conveying it is pushed against either of the doors or shutters E E, causing the latter to open by swinging inward, and allowing the contents of the barrow to be dumped into the furnace. The door, afterward being allowed to swing back by its own weight, pushes back the barrow and closes the opening between the stanchions, thereby preventing any further escape of gas than is unavoidable during the very short intervals actually occupied in depositing the ore, fuel, and flux, or than it is desirable to let escape by the opening *b*.

By this invention not only are the gases prevented from escaping, and conducted in a cold dead state to the place or places where they are to be used, but the destruction of the top of the furnace is prevented, and, beside the saving of fuel effected, an increased production and improved quality of metal are obtained. The quality of the metal can also be regulated by closing the damper D to prevent any escape of gases, or by opening it more or less to permit of a greater or less escape; a softer iron being produced by increasing the escape at the opening *b* and allowing a greater quantity to pass to the blast ovens, and a harder iron being produced by increasing the escape at *b* and allowing less to pass to the ovens. The change from making soft to making hard iron, or *vice versa*, by thus varying the escape can be made in six hours, instead of occupying three or four days, as with the method ordinarily practiced in blast furnaces.

The invention can be applied to any furnace previously in use while it is "in blast," without requiring any blowing out for the purpose.

The doors or shutters herein described, by way of illustrating a means of carrying the invention into effect, instead of being arranged to close in vertical positions, as shown, may be arranged to close at an inclination; and instead of being constructed and arranged to close by their own weight, may have weights applied to them, in any suitable or convenient manner, to produce or assist their closing; or they could be arranged and operated with levers and counterweights to rise and fall or open and close.

The outlet *b*, for the escape of the surplus gases, may be provided with an escape-pipe of any convenient height.

Claims—1. The cover applied to the head of a blast furnace, and provided, substantially as herein described, with one or more charging-apertures and swinging doors for closing the same.

2. The escape-opening *b* and regulating damper, in combination with the cover and its opening and closing charging apertures, substantially as described.

The Mineral Wealth of New Mexico.

A correspondent of the Chicago *Tribune* writes:

Silver City is the center of a section of country about 100 miles square, in all parts of which discoveries of metals, from gold down to iron, have been made. It lies in the Sierra Madre range—the same in which the old mines of Mexico exist, and from which that nation has derived her millions of treasure in the ages past, and which are still yielding almost fabulous amounts, although worked in a very crude and unsystematic manner. The silver mines of this locality are said, by those who have visited both, to be almost exactly of the same general character, equally rich and extensive, and, when fully developed by skilled American labor and improved machinery, will undoubtedly produce much greater proportionate results. The ore from the various mines differ materially in character, and requires different processes for its reduction. A great deal can only be worked by smelting, while some of it can be easily separated by crushing amalgamation. Some of the mines are believed to be huge deposits, while others show true fissure veins. The grade of such of the ore is very high, some yielding as high as $4000 to the ton, and none is worked that does not run as high as $60 to $75 per ton. Then there are millions upon millions of low-grade ore, which will run from $20 to $60 to the ton.

A few miles to the north are the famous Pinos Altos Placers, which are rich in gold, but lack water for working; there are also rich and well defined true fissure veins of both gold and silver, which are more or less worked, some to the depth of 100 feet. Pinos Altos is a remarkably rich district, and will eventually give employment to thousands of people. Lone Mountain district is about nine miles east of this place, and contains many mines of great richness, nearly all the ore from which shows pure horn silver. The disadvantage under which this place is laboring is the lack of milling facilities, or means of reducing the ore. About 15 miles northeast of Silver City is the renowned Santo Bite copper mine, which has been worked for many years, yielding ore so rich in copper and gold as to make it profitable to pack it on mules to the coast, a distance of 1000 miles, thence ship to Europe for separation. The cheaper transportation which will be furnished upon the completion of the Texas Pacific Railway will make this mine one of great value. In the same vicinity are the Hanover and San Jose copper mines, and also an iron mountain, from which ore has been taken sufficiently pure to be hammered out without smelting. To the westward are the Burro Mountains, which are almost a mass of ore—gold, silver and copper all being found there. Ralston, just west of these mountains, is another place where millions of tons of rich silver ore exists, but cannot at present be obtained for lack of wood and water. In time, a road will be built from these mines to the Gila River, a distance of 25 miles, over which the ore will be transported to the splendid water-powers on this river, where it may be profitably worked. Among other discoveries made in this vicinity may be enumerated kaolin, fire-clay and a vein of very fine white marble. Good indications of coal exists, and the early discovery of this mineral is confidently expected. There is a splendid future in store for this section of country, which will be hastened by the construction of the Texas Pacific Railway, which is now being rapidly built. It is expected the cars will reach here in about two years, and then the greatest drawback to the prosperity of this regon will be removed, viz., expensive and slow transportation. The natural wealth of this country is enormous. Here are mountains of precious metals, enough to build an empire, only waiting the means of development. The present supply of mills and reduction works is not equal to one-tenth of the demand. Let capitalists make a note of this. Settlement in this country has been greatly retarded by the hostility of the Indians; but Cochise, the great chief of the Apaches, having made peace, and his people having gone on their reservation in Arizona, it is believed there will be little further difficulty of the kind, although it is still deemed advisable to travel in company, and armed, to insure freedom from molestation by roving outlaws whom the chief may not be able to control.

The Lundin Furnace.

Mr. John W. Whinfield, C. E., contributes to our Pittsburgh contemporary, the *American Manufacturer*, the following account of the Lundin furnace for puddling with fine moist fuel, such as undried turf and peat or wet sawdust:

The furnace is the invention of F. Lundin, of Carlstadt Munkfors, Swelen. The invention has been deemed so valuable that the Swedish ironmasters have rewarded Lundin by a gift of $10,000, quite a large sum in that country. In this furnace the fuel is fed by a hopper into a reservoir, resting upon an inclined grate, supplied from below with air from a blower. The products of combustion thus produced pass through a condenser, where all the moisture in the gas is condensed. The gas then passes to a heating furnace which is furnished with Siemens' regenerators. Fuel containing as much as 45 per cent. of water can be used, and the resulting gas contains about thirty-three pounds of water to one hundred of dry gas. The condensing apparatus consists of 3500 lbs. of iron bars piled crosswise on each other and kept cold by a jet of water from a tuyere. The heat of the gas before condensation of the water, always melts lead easily, and sometimes zinc. The expense of the construction of a full sized furnace, in Sweden, is about $2500, currency, and it is estimated that such a furnace will utilize 1700 tons of fuel per year. In the Ekman furnace dry wood containing eight per cent. of water produces in the generators gas of a temperature of 1394°, while in the Lundin furnace the temperature is 2666°.

The duration of the furnace is simply surprising, and is to be attributed to the fact that there is no cinder. In eight weeks the thickness of the roof, 4 inches, was only diminished from ¼ to ⅝ inch and the side walls were entirely uninjured.

There can be no question of the great value of this furnace in certain regions of our country. Where sawdust or peat abounds it can be used to the greatest advantage. We do not see why fine coal that collects in such large quantities about the month of pits could not be utilized.*

As a practical statement of its value we give the following table, showing the result of the first year's working of a sawdust furnace at Munkfors, during the year 1866, as compared with the results obtained from the charcoal furnaces of the society of Uddcholm. The two coal furnaces served at the same time as reserves, and were only worked while the other was under repairs. During the first six months the yield was 789 tons of bar iron, and in the last six months 1013 tons, of which 557 tons was during the last three months, or 2229 tons per year.

The column containing the consumption of carbon of wood not coked per ton is calculated on the assumption that a cubic foot of charcoal contains eight pounds of pure carbon, and that 50 per cent. of richness of the wood in carbon is lost in coking. The column shows, therefore, the real consumption of carbon per ton of iron made.

In comparing the consumption of fuel in the sawdust furnace with that of the charcoal furnaces, it will be seen that the first was able to heat three hundredweight of iron with the same quantity of combustible that the latter would have required for one hundredweight, and this though the former works with wet fuel.

The latest results of the sawdust furnace are as follows: From November 10, 1866, to April 18, 1867, or during 105 days of 24 hours, a yield of 926 tons of bar iron, with a waste of 12·04 per cent., and with 368 cubic feet sawdust per ton of iron. One week showed a yield of 56·18 tons, with 219 cubic feet per ton, the waste being only 9·9 per cent. At present the waste does not exceed 11 per cent. (April, 1867).

TABLE

Showing the results of the working of the sawdust furnace at Munkfors during the year 1866, comparatively with the results obtained from the charcoal furnaces of the Society of Uddcholm.

Year of operation, 1866.	Time in days (24 hours) and hours.	Loops, tons.	Iron detach'd fr'm the loops and ends cut fr'm bars, t'ns	Iron drawn into bars, tons.	Waste ℘ cent	Consumption per ton. Cubic ft saw d'st	Cubic ft ch'rcoal	Lbs. w'd not coked.	Hours.	Maxi'm yield of a single furnace ℘ week, tons.
Charcoal furnace at Gustafors	264 9	1,008·65	47 80	836·97	12·89	...	157	2,530	0·75	22 65
Charcoal furnace at Stjernfors	329 1	949·35	41 22	793·08	12·66	...	169	2,662	0·78	23 04
Charcoal furnace at Munkfors	274 21	1,067·72	54 35	889·87	12·19	...	193	2,134	0·73	23 34
Charcoal furnaces at Gustafors	284·4	1,076·77	46 68	866·53	13·26	...	188	2,706	0·75	22 22
The preceding four years, average—										
Sum	253 13	2,165·58	133 19	1,802·24	...	...	...	...	...	...
Charcoal furnace at Stjernfors	263·8	1,094·08	54 12	885·50	12·18	...	157	2,880	0·75	23 99
Two charcoal furnaces at Munkfors	47·2	325·62	18 20	269·41	12·19	...	153	2,194	0·83	20 64
Sawdust furnaces at Munkfors	306 11	1,839·96	104 99	1,553·30	11·7	271	...	806	0 31	57 50

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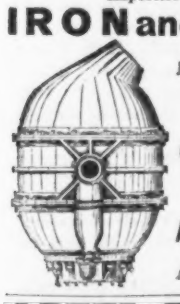

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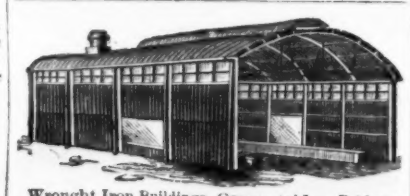

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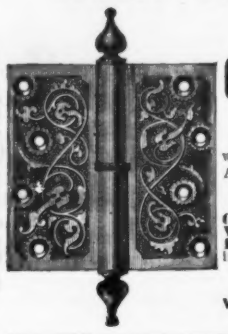

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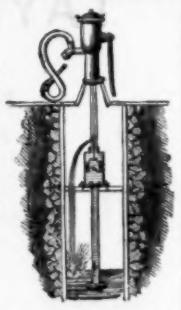

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On the Molecular Changes Produced in Iron by Variations of Temperature.

BY PROFESSOR R. H. THURSTON.

(Continued.)

46. Mr. Peter Spence gave a description of his experiments upon bars of cast iron, one-half inch square, placed on supports nine inches apart, and broken by carefully applied and steady pressure.

Six experiments were made at 60°, and six at 0° Fahr. He sums up the evidence thus:

"The bars at zero broke with more regularity than at 60°, but, instead of the results confirming the general impression as to cold rendering iron more brittle, they are calculated to substantiate an exactly opposite idea, namely, that reduction of temperature, *ceteris paribus*, increases the strength of cast iron." He found this increase to amount to 3½ per cent. between 60° and 0°.

47. Subsequently, Mr. Spence made a more extended series of experiments.

He obtained 50 bars of cast iron (of mixed Scotch brands), each three feet long and one-half inch square, cut them into lengths of one foot, and mixed them thoroughly. Seventy pieces were tested at zero, after 48 hours exposure to a freezing mixture of salt and ice, and 70 were tested at 70° Fahr.

The breaking weights of the pieces averaged 430·3 lbs., warm, and 442·8 lbs. at zero, the weight being placed midway between supports nine inches apart.

Mr. Spence finally says*: "I have no hesitation in giving it as an ascertained law, that a specimen of cast iron, having, at 70° Fahr., a given power of resistance to transverse strain, will, on its temperature being reduced to 0°, have that power increased three per cent."

Mr. Spence notices a circumstance, which occurred in the course of his experiments, which may throw some light upon the molecular constitution of metals and thus, indirectly, upon the subject discussed. A weight of 449 lbs. had been suspended from one of the bars tested, for the space of nearly two minutes: the bar finally broke after a single one lb. weight had been, without the slightest jar, lifted off—so slowly, in fact, that its upward motion was barely perceptible. It may be imagined that the fact is new evidence of the existence of viscosity in even cold iron.

48. The most complete investigation ever made, particularly to determine the effect of changes of temperature in modifying the physical properties of iron and steel, was that of Knut Styffe, the director of the Royal Technological Institute, at Stockholm, Sweden, and supplemented by the experiments of Christer P. Sandberg, who translated the report of Styffe into English.

The work of the first named engineer was done at the instance of a committee appointed by the king of Sweden. It was commenced by Professor Angstrom, continued by Herr R. Thalen, of the University of Upsala, and by Engineer K. Cronstrand, and it was finally concluded, with the assistance of Cronstand and Lindell, by Styffe, who wrote out the results of the whole investigation and made the report public.

These labors were begun in 1863 and extended over several years.

The conclusions of Styffe were:

"(1.) That the absolute strength of iron and steel is not diminished by cold, but that, even at the lowest temperature which ever occurs in Sweden, it is at least as great as at ordinary temperature (about 60° Fahr)."

"(2.) That, at temperatures between 212° and 392° Fahr., the absolute strength of steel is nearly the same as at ordinary temperature, but, in soft iron, is always greater."

"(3.) That neither in steel nor in iron is the extensibility less in severe cold than at ordinary temperature, but that, from 266° to 320 Fahr., it is generally diminished, not to any great extent in steel, but considerably in iron."

"(4.) That the limit of elasticity, in both steel and iron, lies higher in severe cold; but that at about 284° Fahr., it is lower, at least in iron, than at ordinary temperatures."

"(5.) That the modulus of elasticity in both steel and iron is increased on reduction of temperature, and diminished on elevation of temperature; but that these variations never exceed 0·05 per cent. for a change of temperature of 1·8° Fahr., and, therefore, that such variations, at least for ordinary purposes, are of no special importance."

49. An equally well conducted series of experiments on transverse strength and the flexure of iron and steel led to the following conclusions:

"(1.) Iron sustains, at lower temperatures, a greater, and at higher, a smaller load than at the ordinary temperature, before it obtains any perceptible permanent deflections."

"(2.) The modulus of elasticity for steel and iron on flexure, may, for practical purposes, and without committing any considerable error, be generally assumed equal to that on traction. It is diminished by permanent deflection, but may be restored by heating, especially if raised to a red heat."

"(3.) By hardening steel, its modulus of elasticity is diminished, but this diminution has not, in any of the hardened bars examined, amounted to more than about three per cent."

"(4.) The elastic force of iron and steel on flexion, as on traction, is increased on reduction of temperature and diminished on elevation of temperature. The amount of this increase or decrease for a change of temperature equal to 1·8° Fahr. (1° centigrade) does not, however, in general, amount to more than 0·03 per cent., and, apparently, never rises to 0·05 per cent."

50. The experimenter states that "the results of the experiments given above are evidently opposed to the opinion hitherto commonly entertained, viz., that steel and iron become weak or brittle at low temperatures," and gives it as his opinion that the cause of the frequent breakage of rails in cold weather, and of articles made of iron and steel, is unequal expansion and contraction and the rigidity of supports, where, as is the case with rails, frost may very greatly affect them.

51. Sandberg, while admitting the care and the accuracy which distinguished this extensive series of experiments, still doubted whether the reasons just given were the sole reasons why metals should more readily break in cold than in hot weather, and, having obtained the consent of the State Railway Administration, he conducted a series of experiments, in the summer and winter of 1867, at Stockholm, to determine whether, with equal rigidity of supports, iron rails would yield with equal readiness to blows at the two extremes of temperature.

The rails experimented upon were each cut in two halves, and one piece was tested in cold, and the other warm, weather, at temperatures of 10° and 84° Fahr. respectively. The supports at the ends of the rails were granite blocks, placed four feet apart, and resting on the smoothly levelled surface of the granite rock. They were broken by a heavy drop, weighing nine cwt.

Sandberg's conclusions, from 20 experiments, are thus given:

"(1.) That, for such iron as is usually employed for rails in the three principal rail making countries (Wales, France, and Belgium), the breaking strain, as tested by sudden blows or shocks, is considerably influenced by cold; such iron exhibiting, at 10° Fahr., only from one-third to one-fourth of the strength which it possesses at 84° Fahr."

"(2.) That the ductility and flexibility of such iron is also much affected by cold; rails broken at 10° Fahr., showing, on an average, a permanent deflection of less than one inch, whilst the other halves of the same rails, broken at 84° Fahr., showed a set of more than four inches before fracture."

"(3.) That, at summer heat, the strength of Aberdare rails was 20 per cent. greater than that of the Creusot rails; but that, in winter, the latter were 30 per cent. stronger than the former."

Sandberg suggests that this considerable decrease of toughness at low temperatures may be due to the "cold shortness" produced by the presence of phosphorus.

Our knowledge on this point must remain imperfect until similar experiments have been made with iron free from phosphorus.

52. The researches above described constitute the experimental basis of our knowledge of the effect of change of temperature in producing alterations of molecular structure and of strength and resilience in metals.

A few other less elaborate, though instructive, experiments have been made, some of which enlarge our knowledge of molecular physics somewhat, although bearing less directly upon the problem under consideration.

53. Professor W. F. Johnson, in 1844, gave the results of experiments made under the direction of the United States Navy Department, which revealed the fact that the increased strength, at moderately high temperatures, which was noted by the committee of the Franklin Institute, was retained, on cooling, provided that the bars were submitted to powerful tension while heated.

Prof. Johnson reports* that "the average gain of length of bolts of iron treated at the Washington navy yard, by this same process, was 5·75 per cent., and the gain of strength 16·64, making, together, the gain of value 22·4 per cent.

"In many instances the experiments made at the Franklin Institute proved the gain of length to exceed 7 per cent. The report to the bureau also confirms what had been previously observed, viz., that the total elongation of a bar of iron, broken in its original cold state, is from two to three times as great as the same force would produce upon it if applied at a temperature of 573°, which force will, moreover, not break the bar at that temperature."

54. Professor Thompson has indicated† the existence of a resistance to molecular movement, such as has been referred to already, and designated "molecular friction." He calls it "viscosity." The term, thus used, designates a somewhat different property from that to which the name is generally applied, and which was illustrated by Tresca's experiments, already described, and other similar experiments.

He deduced the following:

(1.) That there is a certain internal resistance which is independent of the elastic properties of metals.

(2.) That it does not affect the coefficient of elasticity.

55. A singular action has been recently detected by W. H. Johnson‡, which may prove instructive in this connection.

Iron was immersed in hydrochloric acid one or more hours, and then tested for elongation and breaking strain. The pieces were then heated, and again tested with the following results:

(1.) "That immersion in acid diminishes the breaking strain of iron wire from ¼ to 3 per cent., and of steel wire about 4·76 per cent.

(2.) That immersion in acid appears, in some cases, to diminish, and, in others, slightly to augment the elongation of iron wire, and to augment the elongation of steel wire about 30 per cent."

Heat restored to the iron its original toughness.

Pyroligneous and sulphuric acids had the same effect as hydrochloric, in different degrees.

Copper was not affected in this manner.

The cause of this peculiar action remains undetermined. The phenomenon is of interest principally as confirming an inference deducible from other experiments, viz., that, in general, circumstances tending to increase the strength of a metal, by molecular change, also tend to reduce its viscosity and its extensibility, and *vice versa*.

56. The experiments of Mr. Oliver Williams,* in determining the change produced in the character of the fracture of iron by transverse strain, at extreme temperatures, were more evidently pertinent to this subject.

Mr. Williams says, of two specimens of nut iron, cut from different bars, made at Catasauqua, Pennsylvania, "These specimens were first nicked with a cleft on one side only, and then broken under a hammer, at a temperature of about 20° Fahr. At this temperature, both specimens broke off short, showing a clearly defined granular, or steely iron fracture. The pieces were then gradually heated to about 75° Fahr., and then broken, as before, developing a fine clear fibrous grain. The two fractures were but four inches apart, and are entirely different."

57. It has been long known that a granular fracture may be produced by a shock, in iron which appears fibrous when gradually torn apart.

This was fully proven by Kirkaldy,†. Mr. Williams was, probably, the first to make the experiment just described, and thus to make a direct comparison of the characteristics of fracture in the same iron at different temperatures.

A fair inference, from these experiments is, apparently, that a reduction of temperature increases the polarizing force, decreases the viscosity of the metal, and thus causes its fracture to assume the appearance which characterizes the fracture of substances which are remarkable for their rigidity; while elevation of temperature, increasing viscosity, allows greater extension before fracture, and this greater toughness is evidenced by the sort of fracture characteristic of less brittle materials.

58. Nothing in these experiments affords any indication of the effect of change of temperature, in this instance, upon the strength of the metal. It has, however, been shown that low temperatures increase the strength of metals, and Mr. Williams' experiments are confirmatory of the supposition, of which strong evidence has already been quoted, that it also *decreases* resilience, or the power of resisting blows and heavy shocks.

The experience of every mechanic who has observed the behavior of tools and of metals at different temperatures, also confirms this belief. Tools yield readily to blows, where exposed to severe cold, although not evidently weak under steady strain.

59. It has been remarked (Article 22), that we should anticipate that the effects of change of temperature would be most marked with metals of low melting points.

The observations of Prof. Fritzsche, who noticed that extreme cold produced upon tin an effect somewhat similar, but even more striking than that remarked by Mr. Williams in the case of iron, may be accepted as corroborating this idea.

The well known variations in the ductility of zinc, when under varying conditions of temperature, are also noticeable evidence of the marked rapidity of such changes, where the range of temperature, within which the body remains solid, is narrow.

[To be continued.]

* London *Engineering*, 1871; vol. 11, p. 179.

* Senate Document, No. 1, 1844-5; and American Journal of Science and Arts, 1846, vol. 1, p. 300.

† Civil Engineers' Journal, Vol. 28.

‡ "Iron," April, 1873, p. 452.

The Manchester working men are having a competitive examination to decide who shall be sent to the Vienna Exposition to make reports upon various branches of mechanical industry. The requirement is that they shall be competent to report intelligently upon one of seven branches of industry, and to ascertain this the competitive examination is being conducted. The successful candidates are to have their fares paid to and from Vienna, and their expenses while there, and a small sum on their return upon the delivery of the reports. The seven branches specified are the production of locomotives, of stationary engines, of boilers, of general machinery, including that for calico printing, bleaching, dyeing, &c., of machinery for cotton spinning and weaving, of brass and copper smiths' work, and the manufacture of tools. They are to be specially instructed to "describe processes clearly, and detect new features in the exhibited works." The British workingmen who were sent on similar duty to the Paris Exposition in 1867 made very valuable reports, and similarly important results are anticipated at Vienna. The British Commissioners to the Exposition are to give every possible assistance to these workingmen, and their practical views of the improved machinery exhibited there are expected to be advantageous to every branch of mechanical industry.

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* *The Iron Age*, New York, March 13, 1873, p. 16.

† Experiments on Iron and Steel,

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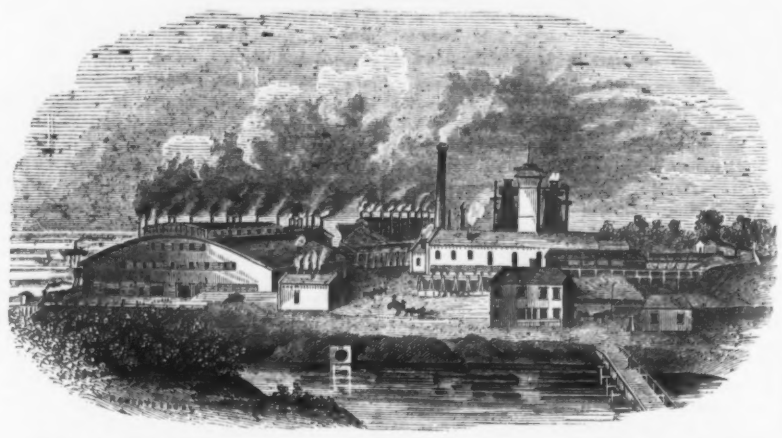

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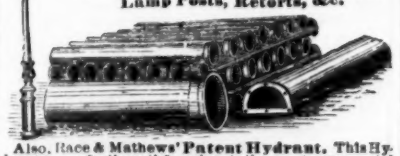

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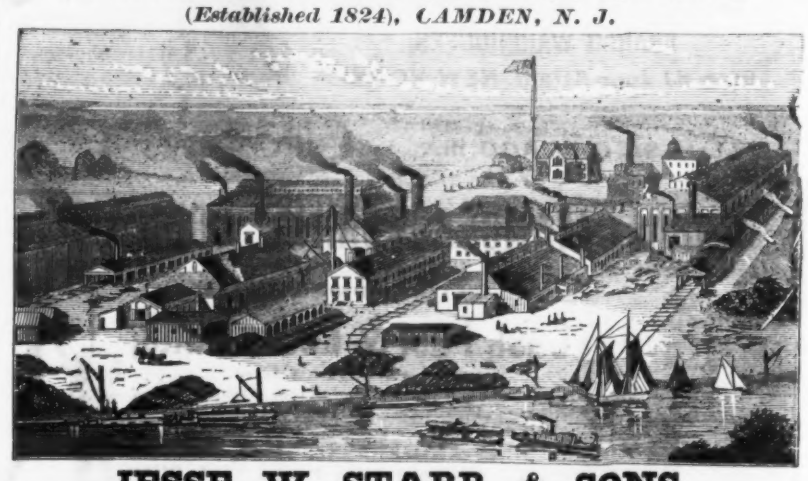

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The Metallurgical Features of the Vienna Exposition.

[*Special Correspondence for The Iron Age.*]

VIENNA, Austria, June 5, 1873.

We now proceed to the description of the private and public exhibitions made by the Empire of Austria. Among the largest of the private exhibitors are the establishments of Prince Schwarzenberg, and that of Prince August von Sachsen-Coburg-Gotha, in Austria and Hungary. Each of these exhibitions are strictly private. They are contained in large, separate buildings, erected at the expense of the respective princes.

The exhibition of the Prince of Schwarzenberg is contained in a beautiful building of brick and wood. What is peculiar of this house is, that all of the materials employed in its construction are from the lands of the prince. Everything was prepared in his province, the house being simply put together on its arrival at the grounds of the exhibition. The building exhibits all the various products of the lands of the proprietor; grain, cereals, wood work, etc., together with the various products of his mines. It is to these latter that we shall, of course, devote ourselves. The prince possesses valuable mines of brown coal and iron, together with extensive iron works at Steiermarth, in Austria, and valuable mines of stone and brown coal, graphite and silver in Bohemia. The value of these mines may be estimated from their annual yield.

	Centners
Pig Iron	360,000
Bessemer Steel	40,000
Rod Iron	2,800
Agricultural Implements	1,000

The yield of brown and stone coal from Bohemia per annum is estimated at 1,200,000 centners. That of graphite is equal to 180,000 centners; that of turf or peat, 400,000 centners. The various works furnish employment to about 4000 men. The iron works manufacture railroad iron. Their chief production is that of pig iron and Bessemer steel for the making of agricultural implements, and bar and rod iron. In that end of the room devoted to the display of the metallurgical wealth of the estates there is a very pretty column formed of the finished products and raw material of the mines. The graphite obtained from the mines of the prince is of the finest quality, and is employed by the most celebrated manufacturers of lead pencils in the world, many of which exhibit cases of their pencils alongside of the crude and refined graphites from the mines. Among these we notice the following noted manufacturers: J. W. Guttknecht, of Nurenberg; A. W. Faber, manufacturer of graded leads: Johann Froescheis, of Nurenberg, and Grossberger & Kierf. The display of graphite specimens is rich, both in quantity and quality. Among many beautiful pieces of the mineral we note a huge block of pure graphite (crude) carved into a grotesque form, bearing on its face the Austrian shield. Together with the display of exceedingly rich and valuable brown coals, are placed specimens of impure coals, that are chiefly employed in the manufacture of gas. They are principally rich carboniferous shales, some almost pure enough to be employed directly for fuel. These brown coals come from the mines at Yudenberg. A good display of building materials is made. The estates yield the following: granite, serpentine, porphyry, sandstone, granolite, excellent marble, both white and variegated, and a valuable quartz conglomerate, employed to line the inside of the blast furnaces. In the center of the building, which is 15 metres broad and 35 metres long, is placed a beautiful monument of carved marble obtained from the estates.

The value of the extensive properties of the prince may be estimated from the amount of his taxes to the Austrian government, which reach annually the sum of 1,150,000 guilders, or about $575,000.

We next proceed to the building devoted to the exhibition of the estates of Prince August von Sachsen-Coburg-Gotha. As before, we shall mention only the metallurgical features of his exhibition. The lands of the prince lie partly in Lower Austria, but the greater portion are to be found in Hungary, in the following counties: Hout, Neograd, Gomor, Borsod, Heves, Pest, Pilis and Zips. The prince has valuable beds of iron ores on his estates; they are either hematites or spathic irons. The annual yield of the mines may be placed at 763,000 centners. They expect shortly, in consequence of contemplated improvements, to raise the annual yield to 1,484,000 centners. For full statistical information of these valuable mines, we refer our readers to an excellent publication called "*Statistische Beitrage uber die Guter von Prince, A. v. S. C. Gotha, in Oesterreich und Ungarin.*" There are no beds of coal on the estates, but plenty of timber. Consequently all the iron is charcoal iron, and of the finest quality. The mines and works furnish employment for 3000 men. We note a valuable collection of ores and building materials from the estates on exhibition in the building. The finished products of iron are chiefly agricultural implements, bar, rod and sheet iron. The works produce no Bessemer steel.

The exhibition of the Karnten district, in the southwestern part of Austria, in the mountainous district near the Italian border, is represented in a large separate building; only its metalurgical features are presented. The chief industries of the region are two, viz., the iron and lead, though other metals are produced. In the front of the building is a very handsome monument of blue marble, bearing a single pillar. The material is from the quarries at Klagenfurt. The following interesting statistics are from carefully prepared charts that adorn the walls of the room. The annual yield of iron ore for the whole district, during 1872, amounted to 3,150,000 centners; that of cast iron, to 1,250,000 centners. The value of these are as follows: Ore, 800,000 florins, or $400,000; iron, $2,750,000. The increased production during the last nine years may be judged from the following:

ORES. Centners.		CAST IRON. Centners.	
1864	1,430,000	1864	500,000
1867	1,800,000	1867	850,000
1870	2,600,000	1870	1,050,000
1871	2,800,000	1871	1,230,000

LEAD PRODUCTION.

1868, 1,000,000 centners; nearly the same quantity each year since 1863. Value, $500,000. Zinc yield of 1869, 100,000 centners.

Valuable beds of graphite are found in the district. The yield of this material was greatest during the years 1867 and 1869. In 1867, 2000 centners were produced; in 1869, 2500 centners. In 1868, the production fell to 1000 centners, which was above the yield for the years 1870, 1871, 1872. The value of the yield of 1869 is estimated at about $1250. Small quantities of gold are also obtained. The greatest yield was in 1868, and amounted to $750. In zinc ores, the greatest yield was in 1868, when about 1,000,000 centners were produced. There has been no increase in the yield during the last eight years, the amount obtained since 1863 being nearly equal to that of 1868. The value of the products is placed at $4,000,000.

The following interesting statistics are given in regard to the production of brown coals: The yield was greatest, during 1863; it then decreased until 1865, and has steadily increased ever since. I append the yield of some of the years:

	Centners.		Centners.
1862	1,300,000	1869	1,100,000
1864	650,000	1870	1,300,000
1867	900,000	1872	1,400,000

The value of the yield of 1872 was $4,000,000. In 1862, the mines and works of the district furnished employment to 8000 hands. In 1864, to 2000; in 1868, to 3000. I will now give a brief discription of the various products exhibited in the building. As exhibitions of the ores, raw materials and finished products of different regions, have much in common with those displayed in the buildings already described, I will pass by all but the most striking. The lead mines and works of Klagenfurt have a beautiful case of lead ores, both washed and unwashed. The same company also exhibit lead pipe, sheets, &c., of various dimensions; shot of different numbers; massicot, litharge and red lead. The establishment of Franz Paul Herbert, whose foundation dates back to the last century, exhibit fine samples of white lead. This firm produces yearly from 15,000 to 20,000 centners of carbonate. Various firms and companies exhibit wire and wire work of different designs. The firm of Ferdinand von Egger, in Klagenfurt, exhibit iron and copper wire. Among their samples we notice a wire 1200 meters in length, placed side by side with a small block of raw iron, the same size and quality as that from which it was drawn. Julins Baron von Silbernagel has also a fine display of the same materials.

The center of the building is devoted to the ores, &c., of the entire district. A fine monument of blue marble from the section is surmounted by a large figure in plaster, representing the genius of mining. The remaining portion of the building, about one-third of the whole, is occupied by the display made by the Hultenberger Iron Works, in Klagenfurt. The company own mines of brown coal and iron. The production of brown coal for 1872 amounted to 1,278,789 centners. During 1872, the production of pig iron was 1,190,472 centners. The greatest yield was in October, when it reached 281,000 centners. The walls of the room are enlivened by photographs of the different works of the company. In neat cases along the wall a fine display is made of the ores of the various mines belonging to the company. The selection of the specimens has been exceedingly careful, and they are such as would make the mouth of a mineralogist to water. This company is reported the largest in all Austria. It manufactures railroad iron, car wheels, bands, &c., in fact, most everything pertaining to railroading. It has on exhibition a rail 120 feet long.

The mineral products of the mines belonging to the Austrian government are exhibited in a large separate building. The display made in this building is one of the most striking we have seen in the entire exposition. Not only are the ores and finished products of the finest description, but the arrangement of the same is exceedingly logical and happy.

Immediately on entering the building by the door nearest the main building of the Exposition, the eye is at once attracted to four artistically arranged pyramids containing, or, in fact, built from, the various mineral products of the mines. To our right on entering stands a pyramidal column 25 feet in hight. The base of the column is surrounded by specimens of copper, lead and quicksilver ores. The ores are all the sulphates, viz.: copper pyrites, galena and cinnabar. A niche in the pedestal on which the column stands is tastefully arched over with splendid specimens of quicksilver ores. The three remaining faces of the pedestal, together with the entire surface of the pyramid, are sheathed with round plates of the celebrated copper from the North Tyrol. Here and there the faces of the pyramid are further ornamented with highly polished copper ingots. The copper from these mines is of the finest quality, and a price considerably in advance of that given for the ordinary metal is readily obtained for it. In another part of the building specimens of the wrought and cast metal testify abundantly to its excellence. We note, among other things, large vessels of hammered copper 6 feet in diameter and 3 feet deep. The vessels are wonderfully thin for their size, and yet the surface is smooth and unbroken.

The column to the left of the entrance is from the lead, silver and copper mines of Pridham, Bohemia. Its size and general shape are intended to make it a match for the copper pyramid already described. The front is ornamented with a large mass of pure silver, surrounded by specimens of lead, iron and copper fabrics, so as to produce a very artistic rosette. The pyramid is, in a mineralogical point of view, wonderfully beautiful. The entire sides are covered with the choicest mineral specimens. We enumerate some of the most striking, all of which are finely crystallized: Galena, iron and copper pyrites, pyromorphite, quartz, sulphide of silver, spathic iron, heavy spar, &c.

Directly opposite this pyramid is one of the same size, formed entirely of blocks of pure rock salt. The blocks are dressed with the same accurracy as if they were of the finest marble, and designed to last for centuries, instead of months merely. In the front face of the pedestal is an immense specimen of huge transparent crystals of rock salt. The faces of the pyramid, as well as those of the pedestal, are ornamented with letters and shields cut from the more finely colored salt crystals. All the salt in the pyramid is from the well known mines at Wieliczka, near Cracow, in Galizien, the northeastern province of Austria. On the front of one of the pedestals, above the group of crystals already mentioned, is an inscription cut in letters of pure blue rock crystal, of wonderful depth of color and transparency. They are from the crystal group of the grotto of Erzherzogin Gisela. In another part of the building, where the salt specimens are displayed at large, we notice beautiful carvings from the transparent crystals. Among a variety of these are crucifixes, cannons, pyramids, chains, lockets, chairs, &c., &c.

The quicksilver mines of Idria are well represented by numerous specimens of the ores, and the manufactured products, viz., various grades of cinnabar and vermillion. The most striking of the display of these mines is a large tank containing 15,000 lbs. of metallic mercury. It is contained in an iron tank, covered with a glass top. An iron ball, 50 lbs. in weight, floating on the surface of the mercury, does not fail to attract the attention of the curious who are unacquainted with the laws of fluid equilibrium.

The annual yield of the mines at Idria may be taken as follows: In the year 1871, 7514 centners of the pure metal was obtained. Its value may be placed at $612,745. Of cinnabar, 33 centners, and of vermillion 537 centners were produced, the joint value of the two being $41,785.

The fourth pyramid is not worthy of much attention. It is of the same hight as the others, and is formed of cylinders of salt obtained from the evaporation of brines. The cylinders gradually decrease in size from the bottom upward. A block of pure silver from the smelting works at Pridham stands in the left wing of the building, and attracts considerable attention from its great size and value. Its weight reaches 1100 lbs.! The Schneeberger, Pfiersch & Pfunderberger mines exhibit immense specimens of copper, lead and zinc ores. A large display is also made of lead ores and smelted lead from the mines at Pridham, Bohemia.

Near the building devoted to the exhibition of the Karnterns ore productions is another of nearly equal size, in which are the ores and products of the estates, mines and manufactures of the States Railroad Company, of Vienna. This company has purchased from the government a tract of land containing 40 square Austrian miles. The company are developing their possessions to their full extent. The lands contain valuable ore beds. The minerals are iron, copper, gold, lead and silver. The company also possess elsewhere valuable beds of coal. The tract of land is called the Banater Domain, and is situated in the southern part of Hungary. The following statistics will serve to show the value of these possessions: From their coal mines in Bohemia the annual yield is about 8,000,000 centners. The coal is an excellent stone coal. From southern Hungary the yield is 4,800,000 centners.

The total yield of iron ore from the Banater Domain per annum is 1,600,000 centners. The yield of pig iron was 700,000 centners. Of this about 500,000 centners were worked up into various products of rolled and wrought iron.

From the steel works in Resicza, in the domain, the yield was 142,000 centners, of which 100,000 centners were worked up into tires and various finished products. The yield of pig and cast iron here was 360,000 centners.

The lead mines at Dognacska, also in the domain, yield annually 200 centners. The lead ores are valuable, however, from the large percentage of silver they contain. The copper yield from the mines of the domain at Esiklova was 1800 centers. The entire yield of silver for the district was 520 pounds; of gold, 60 pounds. Other copper mines of the domain yielded in all 1280 centners, distributed as follows: Szaszka, 640 centners; Oravicza, 570; Dognacska, 120; Moldowa, 50 centners.

The coal mines at Steirerdorff, in Southern Hungary, yield a bituminous shale containing about 10 per cent. of bitumen. These shales are employed by the company for the production of oils, gases and paraffine. The yearly yield of paraffine is 2000 centners; of refined oil, 20,000 centners. The sulphides of the mines are employed in the production of sulphate of copper and sulphuric acid. The yield from the works at Moldowa of unconcentrated acid amounted to 22,000 centners, together with 16,000 centners concentrated up to 66° Baume. The company also produce valuable cements amounting yearly to 22,000 centners. Among the building stones from the domain we notice fine syenite, together with white, brown and black marbles. These latter are of excellent quality. The black is obtainable in blocks of 100 cubic feet. In the manufacturing line the specialty of the company is the production of railroad iron and Bessemer steel. They have two manufactories for rails, one for Bessemer rails, and the other for iron rails, both kinds of which are exhibited in great variety.

What strikes us as being the principal feature of their display of finished iron and steel products is a steel ingot of 20,000 lbs., and a steel tire nearly 10 feet in diameter. These tires are not made by the welding of a steel bar, but are made by rolling out a block of steel, which is first cast in the form of a thick ring. They exhibit tires of various diameters. The principal feature of the exhibition of the domain, however, is a section of the largest of their coal seams, at Steierdorff. It is supported in a huge frame, and stands in the room just as it lies in the coal measures; the vein is 15 English feet thick. The entire mass weighs 20,000 lbs.; the quality of the coal is excellent. The works throughout the domain employ 9500 laborers.

Near this building is still another, devoted to the exhibition of the Vordernberg District, in the southwestern portion of Austria. We can only note the most striking features of the exhibition. The iron and steel trade occupy nearly the entire building.

The Vordernberg Kollocher Industrial Company, at Graz, own iron mines at Krieglach, in Steirmark, also at Kraus and Pichling. They also possess coal fields. They make no railroad iron, but manufacture sheet iron, car and carriage springs, anvils, rod iron, boiler plate, etc.

The St. Egydy and Kinderberger Iron and Steel Industrial Co. exhibit fine files, and iron and steel wires. They have on exhibition, among other things, two specimens of wire, each 1000 metres long; one, 18 m. m. in diameter and weighing 5 lbs.; and another, a wire cable 26 m. m. in diameter, weighing 6000 lbs. We notice also, a wire band 455 metres long, and 52 m. m. broad, weighing 5930 lbs.

The Steierische Iron Co. have the greatest Bessemer steel and iron works in Styria. All their steel is produced from the Styrian iron. No coal is employed in the works only charcoal. Their specialty is railroad iron, ties, and axles, together with large iron plates. They have on exhibition a large steel axle weighing 1800 lbs.

John Blechmann, of Muerzzusch, in Styria, exhibits specimens of his wares. His specialty is crucible cast steel castings. He exhibits as novelties, cast steel anvils, pick-axes, hammers, wrenches, etc. His yearly production averages 3,000,000 lbs. His exhibition of files is the largest and finest in the exposition. The largest of his files weigh 40 lbs.

From the Plate and Iron Works, Styria, we notice a band 110 feet long.

Belgium.—For want of space, we note only the most striking features. The manufactory of Jona, Delheid & Co., at Liege, exhibit steel, iron and copper wire of various sizes and qualities.

The works of Colorister, Raikems, Vandbois & Co., of Liege, exhibit fine sheet iron of various sizes. The two largest displays, however, by Belgium, are made by the Sacieter Arronyne, of Chaletets. This makes a very extensive display of rod, bar and short iron. Their specialty is nail rods and hoop iron. Numerous steel bars are exhibited, with section showing breaking proof. A specimen of hoop iron exhibited by the company is 100 metres long. Ch. & H. Chandoir, Grivenguir Leg., Liege: specialty iron pipes and tubing. They have formed of their wares, two large triumphal arches, 35 feet high. These are built entirely of tubes. In the space between the four pillars of the two arches, rises a tall iron tube, surmounted by a gilt capitol, and ball. The forges and foundries at Mons, of V. Demerbe & Co., exhibit finished products of square, round and plate iron. Their annual yield is 18,000,000 kilogs.

The Iron Industries of Wilmington, Del.

We take the following from the annual report of the Wilmington Board of Trade, just received:

IRON SHIP BUILDING.

This branch of our manufacture has been usually active during the past year, all the yards having been occupied to the extent of their capacity, and indeed having been compelled to decline orders for the want of time and capacity to execute them. In view of the present high prices of iron, the future is uncertain, and should they continue, it will undoubtedly cause a decline, if not a partial suspension, of the business, until the cost of material shall become lower. The difference in the cost of production of iron ships in Wilmington and on the Clyde, exclusive of the premium on gold, is at this time about 10 per cent. only. Taking the present price of gold (14), this increases the difference to about 24 per cent. The falling off in the price of gold which is so generally expected, together with the advance in labor in Great Britain, and the consequent advance in the price of iron there, will soon bring the cost nearly equal in both countries. Indeed, if our ship builders would now use the light and inferior iron in their ships that is used on the Clyde, the cost would not now materially differ. This will not be done, however, for reasons that are too evident to need stating; and by waiting until the prices have adjusted themselves naturally and permanently, a more lasting and desirable prosperity will be gained. There seems to be, then, no cause for anxiety or alarm in the outlook just at this moment. On the contrary, it seems highly probable that this crisis once past, the seat of power for building iron vessels (in which the carrying trade of the world is soon to be done) will transfer itself naturally from the old to the new world. There is much to encourage us in this, not only as Wilmingtonians, but as Americans, for it is only an indication of the advancing power of our free Republic—only another demonstration of the extent and value of our natural resources. Situated nearer the great iron and coal producing districts of Pennsylvania than any other city on tide water, and yet away from the danger of storms and ides, Wilmington has a lively interest in this coming power. Whether we reap the benefits of its coming or not, is for us to say. Nature has done her share. Shall we do ours?

RAILROAD CARS AND CAR WHEELS.

This business has grown to immense proportions in our midst. During the past year another large and enterprising firm has been established, and has already sent away some very elegant work. This addition, beyond all doubt, entitles Wilmington to the leading position in this country in the line of car building. This branch of manufacture is also in a very prosperous condition, with every prospect of still further extension and growth. Wilmington-built cars may be found in all parts of this country, the West Indies, Mexico, and South America.

This business has many peculiarities which entitle it to the good wishes and encouragement of our citizens. Among these may be mentioned the fact that the labor employed is necessarily of a superior quality, and the well paid and skillful mechanic is generally an intelligent and useful citizen, and without wishing or intending to speak at all disparagingly of other classes of mechanics, the presence in this branch of manufacture of so large a number of highly skilled workmen is worthy of notice. With this class of men rests, in a great degree, the reputation of our city in the future, both as to the quality of our work and the character of our city as a place of residence; and our business men owe it to themselves that they are encouraged to become permanently interested in our city, and to feel a proper share of public responsibility. To this end, Wilmington can afford to, and should at once provide for the use of all our mechanics and citizens a free public library, which is all that is needed to supplement our excellent public school system, that the adult population may not be left to depend on their own limited means for whatever information they may desire to acquire. This may seem to be a digression from the purpose and object of this report, but it certainly has a direct bearing in the material interests of the city, inasmuch as it involves, to a considerable extent, the permanency and value of our skilled labor.

The manufacture of car wheels is also one of great extent and interest here. Over 300 wheels per day are turned out, and the business constantly increasing.

IRON.

The manufacture and working of iron will undoubtedly be the chief source of wealth in this city in all time to come. The location of our city, its proximity to the mines and forges of Pennsylvania, its superior facilities of competing railroad and water lines of transportation for the collection of raw material and the distribution of finished work to any part of the world, make it naturally an unexcelled point for this business.

Very large quantities of iron are now consumed here in the building of iron ships, machinery, boilers, etc., and it is probable that among the additions to our industrial enterprises those into which iron enters very largely will take the lead in both numbers and importance.

It is evident that success in a business where freights are so very important, depends on proximity to both mines and market, with facilities for handling goods quickly and cheaply; and just in the proportion that a city possesses these advantages, in that proportion she must lead in the trade, provided always that her people see to it that the manufacturing world have their attention attracted to those advantages. We would not have it understood that our efforts in calling attention to these facts should be devoted to strangers altogether. The greatest successes already made here have been attained by our own people, and in the future our main reliance is on them. They need to be impressed with the fact that energy in this great field of industry can but be amply rewarded. It is evident that this is the time, and Wilmington the place, to push with all possible vigor the manufacture and working of iron. The question of labor is demoralizing the iron producing districts of Great Britain. Scarcity of raw material begins to be felt there also; in short everything seems to point to America as the coming nation for the production of iron; and if America, then, of course, Pennsylvania; and if the iron of Pennsylvania is to find a market for consumption and export, where can it better be done than at Wilmington? What hinders Wilmington from being the Glasgow of America? Nothing but time and the appreciation of her own people. The fact once established by example, that this is the best place on the Atlantic coast to produce iron, and to mold and fashion it into machinery, ships, etc., and capital will soon find its way here to aid us in extending our capacity and strengthen our influence.

While dwelling upon this point it seems proper to call attention to another need for legislation that is felt in this State. We refer to the enactment of a general corporation law, enabling capitalists and others disposed to invest a portion of their means in industrial enterprises, without danger to their other interests. Such a law has long been in operation in most of the States where large manufacturing interests are located, and the result has been to stimulate very largely the growth of those interests. With the enactment of such a law, it is reasonable to suppose that much capital that is owned in this State, and that now seeks other places for investment on account of our usury laws, could be retained here and engaged in these industrial enterprises that are so safe and profitable. We would recommend the new Board of Managers to take the necessary steps to secure the enactment of such a law at the coming session of our legislature.

We append such statistics of the iron interest as we have been able to collect:

Number of tons of iron manufactured	11,750
Value of iron manufactured	$1,300,000
Number of tons of iron consumed	50,000
Value of iron consumed	$5,000,000
Number of tons of anthracite coal consm'd	60,000
" " bituminous " "	25,000

THE NICHOLSON FILE.

All Nicholson Files are cut with the Patent *Increment Cut*, an invention owned and controled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at least) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of Increment Cut File, which possesses all the advantages of hand cut work, and the accuracy and uniformityof machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand for upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

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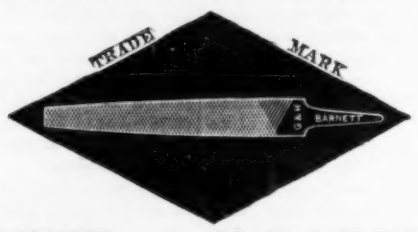

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Very truly, yours, DEWEY, VANCE & Co.

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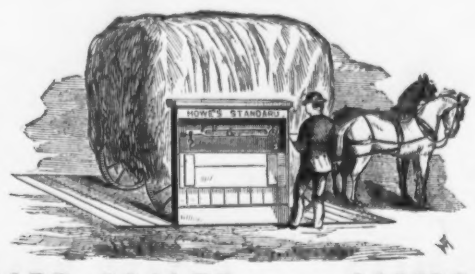

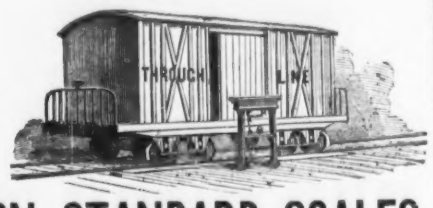

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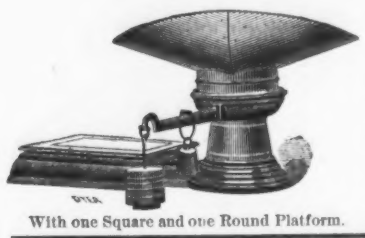

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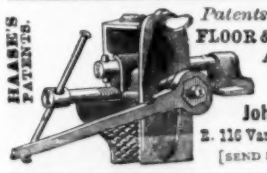

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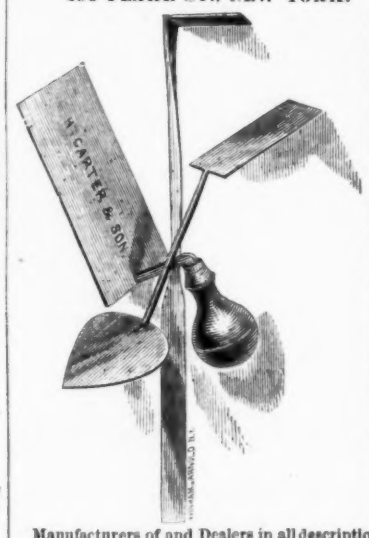

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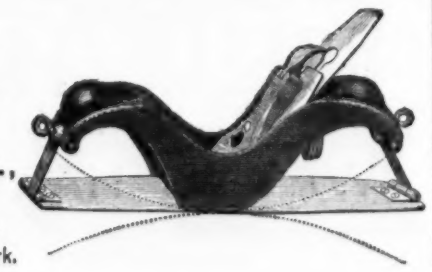

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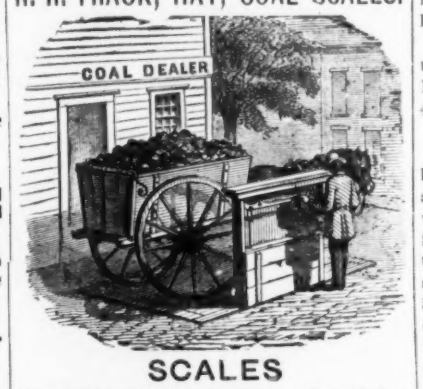

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BUSINESS ITEMS.

PENNSYLVANIA.

The Union Foundry and Machine Company, of Catasauqua, have contracted to furnish a party in New York with 450 tons of car castings. This is an unusually large order to fill, and the largest ever undertaken in that valley.

The managers of the Pottstown Iron Company expect to have the additional furnaces, which are now being erected, completed and ready for service by the 1st of July.

The Sharon *Times* says: A salamander, weighing over 40 tons, has been blasted to pieces and taken from the ground under the old Otis furnace, in this place. The hearth of the furnace burned out some time last spring and allowed the iron to run into the ground, where it was allowed to remain until Mr. J. A. Starkey, one of the best furnace managers in the valley, took the job in hand, and successfully removed the metal. One single piece of the salamander weighs 15 tons.

A. French & Co., of Pittsburgh, manufacturers of elliptic springs for railroad cars, locomotives, and tenders, have increased their working capacity two or three times within a few years past, and have now one of the largest works of the kind in the world. They have capacity for the consumption of four tons of steel per diem, and their springs are used in every section of the country.

New works, called The Jackson Iron and Steel Works, are being erected in the upper part of Allegheny, for the manufacture of agricultural steel. The works will consist of an extensive foundry, converting furnaces, and finishing shops, and are intended to use the new Jackson process of converting the iron castings into steel.

The new Rosina furnace of the Shenango Iron Works, New Castle, commenced operations on the 3d inst. Its cost was $250,000, and is capable of producing 550 to 600 tons of iron per week.

A company has been organized in Pittsburgh, to be known as the American Sectional Steam Boiler Company, for the manufacture of sectional boilers of the Weigand patent. A number of these boilers have recently been placed in various mills and foundries in that city, and have, in every instance, given great satisfaction.

The Harrisburg Car Manufacturing Company recently received an additional order from the New York Central & Hudson River Railroad, for 400 box and 100 platform cars.

MASSACHUSETTS.

The Smith & Wesson fire arms, which are known and used throughout the civilized world, are manufactured at Springfield, by the firm whose name they bear. The Smith & Wesson factory is one of the most perfect of its kind in the world. The main building is 220x40 ft., 4 stories, with an L 40x35 ft., office 45x30 ft., and 5 stories. In the rear of the main building is a shop, 185x45, two stories in hight, where all the woodwork of their fire arms is manufactured, and where the forging is done, 1500 pounds of iron and steel being consumed daily in this department. The machinery of the works is all new, and of the best patterns, most of which is of their own invention, peculiarly adapted to their work, all of which is driven by a Corliss steam engine of 140 horse-power. The firm now employ 450 men, but are soon to increase to 600. They have recently commenced a contract for the Russian government, for which they will turn out 150 army revolvers per day. In all, including all sizes, they turn out 350 revolvers per day. These pistols have been greatly improved by the manufacturers, and enjoy a popularity as well deserved as it is wide. One of their latest improvements is the automatic shell extractor, of which they are the sole owners and manufacturers. Their pistols are light, have greater force, are sure fire, shoot accurately, can be left loaded any length of time without injury, are not liable to get out of order, and are safe to carry. This firm has been established 20 years, during which time they have gained a world-wide reputation. Samples of their goods are found in nearly every well regulated hardware store in the United States and Europe.

Richardson's patent whip holder and fasteners are manufactured by W. W. Richardson & Co., of Westfield. The holder is made of three double C springs of clock steel, held in the center by an expansion ring. It holds the whip in its place with a firm grasp at top and bottom, so that its escape from the socket is impossible, and any abrasion of the whip against the socket is impossible. It is secured to the dash frame by the self-adjusting fasteners. Of these articles the firm turn out about 1000 per day. The demand for them has lately increased so rapidly that it has been found necessary to double the present working force of 10 hands, and to enlarge the product proportionately. The factory of the firm is furnished with machinery especially adapted for their business, most of which was invented by Mr. Richardson.

One of the most interesting manufacturing establishments in Westfield is that of Emerson Sizer, who manufactures a great variety of novel machinery. Prominent in his list of products is his own patent wrought handle working machine. He also manufactures the patent Globe plating machine, machines used in the manufacture of whips, and for plating or covering bell-rope. His factory is supplied with the most improved machinery, which is driven by a steam engine built by Tylor & Co., of Springfield. Mr. Sizer is a veteran in his business, having prosecuted it 25 years with marked success. During that time he has invented important machines which are used by whip manufacturers in all parts of the country.

The Clement & Hawkes Mfg. Co., Northampton, have been under the immediate care of the president and treasurer, W. T. Clement and C. A. Maynard, the past three years, and under them the business has steadily increased, employing now 75 men, which number will be further increased during the coming fall. They manufacture planters' hoes, brick trowels, machinery (to order), and have lately added shovels, spades and scoops to their productions. Their factory is of brick, 150x40, four stories, and forge shops 130x40. The machinery is all first-class, giving every facility for turning out work to advantage, and of best quality, and it is believed their goods are not excelled by any of their class. Mr. Clement has been known as a manufacturer of planters' hoes by the trade during the past 15 years, and the shovels turned out by this company are of first quality. They have no city agency, but keep their stock at factory, and invite parties dealing in their kind of goods to correspond with them.

CONNECTICUT.

An ingenious lock has been patented by the superintendent of the Norwalk Lock Company, for use in hotels and public buildings, which that company will probably manufacture. It is provided with two bolts, and will also operate the independent bolt on the inside, which, when locked, cannot possibly be picked from the outside, even with the master key. The master key, operating on an independent set of tumblers, is so constructed as to pass 300 changes, and can be extended to 480 changes of tumblers on the main bolt, and will also operate on the inside bolt.

RHODE ISLAND.

The Rhode Island Locomotive Works, at Providence, are now turning out 12 engines a month, and have orders on hand for 112. The works employ over 900 men.

The Providence Tool Company have concluded a half-million dollar contract for 200,000 stand of arms, which are to be completed by the first of October. The company have sent agents to Portland, Boston, Worcester, and Springfield, to get all the machinists possible.

VERMONT

The new iron and steel rolling mills at St. Albans, turned out their first rail a few days ago. The works require over a hundred workmen to start with, and when in full blast, will employ a much larger number.

OHIO.

The Cincinnati Iron Bridge Works have just closed a contract with the city of Elmira, New York, for an eight hundred feet Whipple bridge across the Chemung River. The contract price of the bridge is eighty thousand dollars.

The Car Wheel Works, of Messrs. Bowlers, Maher & Brayton, Cleveland, have been established ten years. They are extensive manufacturers of car wheels, and all kinds of castings for railroads and rolling mills. Eighty men are employed. The raw material used, amounting on the average from 20 to 25 tons per day, running one set of hands. The iron consumed at these works is mostly from Lake Superior ore, melted with soft coal at the Mahoning Valley furnaces.

Some of the molders in the Portsmouth Foundry and Machine Works have been on a strike for the past two weeks.

Messrs. Pettengill, Glass & Co., Cleveland, employ about 125 men at an average of about $2·50 per day, and use about 6000 tons of iron and 2000 tons of coal per year, in the manufacture of car wheels and castings of every kind desired.

A new manufacturing company has been formed in Steubenville, entitled the Riverside Coal and Manufacturing Company, with a capital stock of $150,000. The company have a lease for 99 years of 355 acres of coal lands adjacent to Rush Station, on the Cleveland and Pittsburgh Railroad, about 11 miles below Steubenville. The coal vein is six feet thick and lies about 250 feet below the surface. It is the present intention to sink a shaft and engage in mining coal and manufacturing coke, and perhaps in a future day to establish an iron works on the permises.

The American Sheet and Boiler Plate Company, Cleveland, now has its new sheet mill in operation, giving it a capacity of ten tons of galvanized sheet iron a day.

The certificate of incorporation of the Niles Chain Company has been filed with the Secretary of State at Columbus. The capital stock is $25,000, and the following named gentleman are the incorporators: H. H. Mason, L. W. Sanford, G. L. Dickey, Samuel E. Brown, Benjamin Granger, and W. A Mason. This company will at once commence the erection of their works, which are to be located upon the the west bank of the Mosquito creek, adjacent to the Andrews rolling mills. The main building will be 40 by 120 feet in extent, and the company expect to commence operations with a force of 50 operatives, which will be increased as the contemplated additions are made to the works.

The Cleveland Tube Works, Scovill, Chase & Co., were established last October, and manufacture wrought iron pipe and charcoal iron lap welded boiler tubes. The building is a two-story brick, 157x200 feet, and fire proof. The capacity of the works is 20,000 feet of 1 inch pipe every 24 hours, 1500 feet of 4, 5 or 6 inch pipe, and 15,000 to 20,000 feet of boiler flues. From 80 to 100 men are employed, the pay roll amounting to $1200 per week. The business amounts to about $350,000 a year. The capacity will be doubled this season.

There is talk of building a blast furnace in Nelsonville, Athens County, which will use the Nelsonville coal for smelting.

ILLINOIS.

The Union Rolling Mill, of Chicago, turns out 120 tons of rails per day, or about 36,000 tons per year. The rolling-mill building of the company is 280x200 in size, and contains three double puddling and eleven heating furnaces, with one blooming train of rolls for reducing the ingots of steel to blooms, one rail train for rolling T rails, and one puddle train for the rolling of muck bars. In this mill both steel and iron rails are made, the mill running for two weeks on each alternately. The building for the manufacture of Bessemer steel is 150 by 100, and contains two five ton converters, four cupola furnaces, and two reverberatory furnaces for melting the spiegel.

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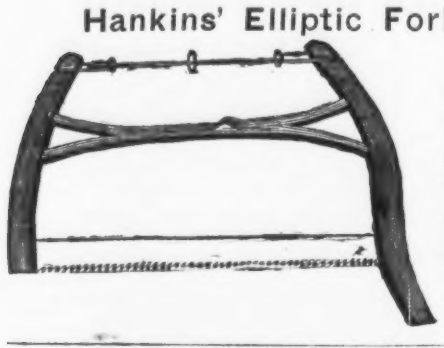

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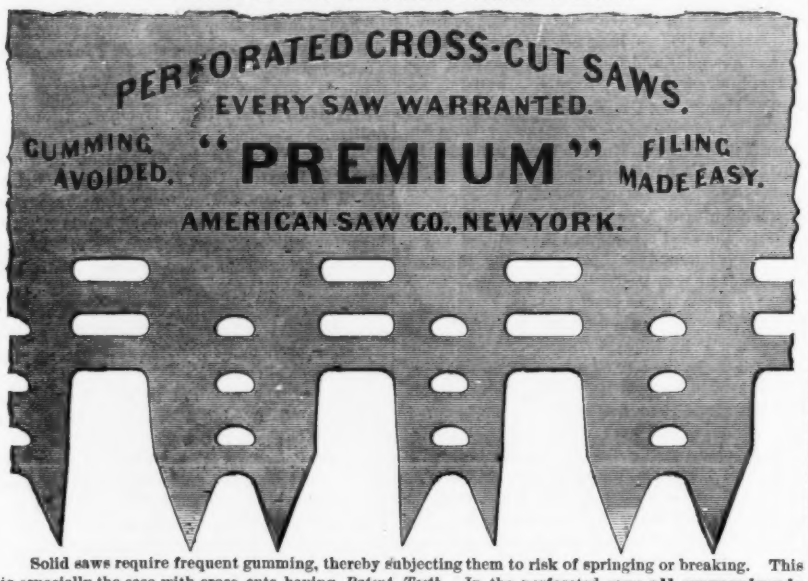

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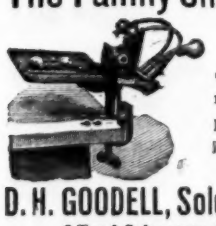

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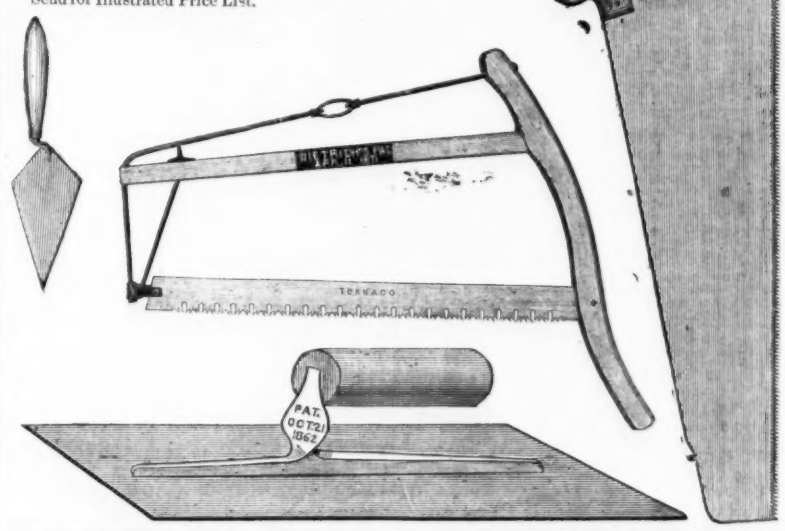

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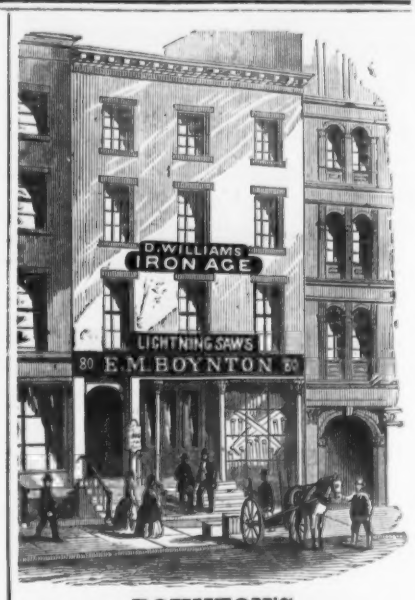

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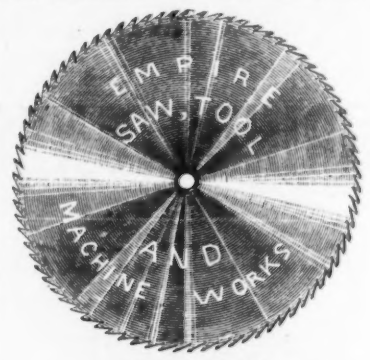

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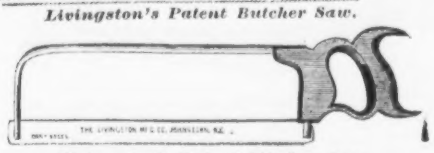
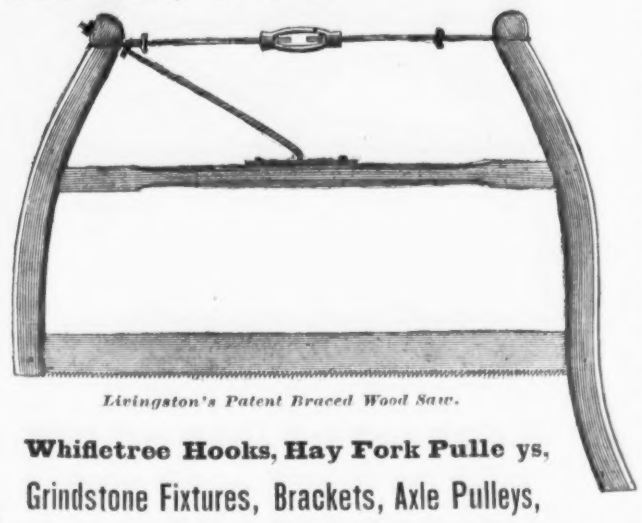


Livingston's Patent Kitchen Saw.



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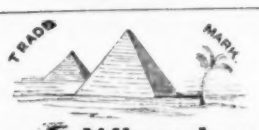

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The Denver and Rio Grande Railroad.—Practical Workings of the Narrow Gauge.

We have received copies of the first annual report of the directors of the Denver and Rio Grande Railroad, the pioneer narrow gauge road of the United States. The report is a document of much interest, especially such portions of it as refer to the practical workings of the narrow gauge, from which we condense the following:

The company has saved about 37½ per cent. in the first cost of construction and equipment of its road by reason of the adoption of a gauge of 3 feet instead of 4 feet 8½ inches. This is a clear saving, because the road is equally well built in every respect and its capacity as great as though it had been of the wider gauge.

As for the increase of business from year to year, requiring additional equipment and extensions of the side tracks, there will continue to be a large saving over the other gauge in the outlays necessary to carry this increase of traffic, and as it is not possible to see that a second track will be required any sooner on the road in consequence of its having a narrow gauge, it is believed that the final efficiency of the line is as great as that of any road with the same gradients and alignments.

The trains—passenger and freight—have been run at the same rates of speed which have prevailed on the Pacific lines and on all the other broad gauge roads west of the Missouri River, and when required on special occasions have run with steadiness at 30 and 40 miles per hour. The passenger cars have proven comfortable and at least as steady in riding as those on the wider roads, and freight cars have carried satisfactorily all classes of traffic, bulky and concentrated. There has been no accident on the road, and the center of gravity of the cars is so much lowered that one could hardly occur that would be traceable to the gauge. In addition to first and second class passengers, the road has carried during the past year freight of great variety in character. Beside heavy articles—coal, ores, stone, lumber, iron, hardware, grain, etc.—it has carried wool, furniture, hay, wagons, and other freight of the lightest and most bulky nature; while, of course, on this last class, the benefit derived from the gauge by the saving in dead car weight has not been so great, yet there is no class of freight upon which the proportion of paying to non-paying weight has not been in favor of the narrow gauge as compared with the wide.

With concentrated or heavy freight, which constitutes on this as on nearly all railroads the great bulk of the tonnage to be transported, the advantage realized has been 35 per cent. That is to say, thirty-five hundreths more freight has been regularly carried on the narrow gauge rolling stock, with the same total weight of cars and load as on the broad gauge. This can be most readily seen by observing a train of 16 loaded cars (which weigh say 8½ tons each when empty) arriving at Denver on the broad gauge roads, and their contents transferred to the Denver and Rio Grande Railway. The same freight is placed in 20 narrow-gauge cars, the empty weight of which is somewhat less than 3 tons each. The comparison will than stand as follows:

Cars.	Empty weight.	Paying load.
16 wide gauge....	8½ tons each	10 tons each
20 narrow gauge..	less than 3 "	8 "

Cars.	Total dead weight.	Total paying load.	Total weight cars and load.
16 wide gauge....	136 tons	160	296
20 narrow gauge..	60 "	160	220
Saving in Total weight.....			76 tons.

Which is equivalent, after allowing for the weight of cars necessary to carry it, to 56 tons additional freight which the narrow gauge train could take without any increase of weigth over the broad gauge train. In other words, 35 per cent. more—this is on the presumption that the cars on each gauge are fully loaded. But it very often happens in the ordinary course of railroad business that cars are very frequently not loaded to their capacity, in which event the narrow gauge receives a proportionately greater benefit. For instance, if from any station there was a load of but 5½ tons to carry, the narrow gauge car would weigh no more with this load than the broad gauge car would, entirely empty.

It is the case with almost any kind of freight that whatever a car on the Denver and Rio Grande Railway holds of goods up to 5½ tons is so much clear gain to it. That is, it can carry that much in each car as cheaply as the wide gauge road can run its cars empty. Now this is true, and constitutes a highly important advantage unless there are some offsetting disadvantages.

Certain inquiries naturally arise:

Are the narrow gauge cars too light to stand the rough usage for any length of time?

No; because, as all the other cars on the road are likewise light, they are not subjected to any more momentum or crushing force in proportion to their strength than a wide gauge car is where all are heavy; and further, it is a well known fact in mechanics, that small structures are much stronger in proportion to their weight than large ones.

Are not the cars too small to carry certain kinds of freight advantageously?

No; because the last year's business showed that, in average actual working, the narrow gauge box-car, weighing 4 tons, carries even—

Of wool in sacks, loose.....	5,000 pounds.
Of wool in bales, loose.....	8,000 "
Of wagons and agricultural machinery	9,000 "
Of furniture, "set up" (carried at double first-class rates, as usual).....	4,000 "
Of furniture, "knocked down".....	10,000 "

These are the most bulky articles which a railroad has to carry; but even of these the proportion of empty to paying weight is in favor of the narrow gauge.

Whereas, of

Groceries and dry goods (assorted), the average load of a car was.....	12,500 pounds.
And of iron, nails, hardware, lumber, timber, ties, grain and flour, ores, coal, stone, lime, cordwood, and nearly all other freights, it was.....	16,000 "

Upon which the advantage of 35 per cent., shown by the above calculation, is fully realized.

The cars might, without risk, be somewhat widened to accommodate the bulkier class of freights; but they could not be retained separately for these articles, and it would be of doubtful advantage to increase the weight and width of all or nearly all the cars for the sake of this small special class of business.

Can cattle and horses be carried?

Yes. The stock cars already built are 6½ feet wide, 28 feet long, weight 8500 pounds, and carry nine head of cattle.

The comparison with the broad gauge is as follows:

	Empty weight.	No. of cattle.	Dead wei't of car to 1 animal
Wide gauge cattle car, 30 ft. long, 8 ft. wide inside.....	19,000	14	1,357 pounds.
Narrow gauge cattle car, 6½ ft. wide, 23 ft. long	8,500	9	944 "

Saving about 30 per cent.

Is the gauge well adapted to passenger travel?

The cars are comfortable, well ventilated, handsomely fitted up, and the 25,000 passengers who passed over the road last year certainly rode as steadily, and, as far as could be judged, altogether as satisfactorily as on any wide gauge road.

The first-class narrow gauge car is 7 feet 2¾ inches wide inside; 35 feet 4½ inches long, weighs 7½ tons net, and seats 36 passengers—an average of 417 pounds of car weight to one passenger. The broad gauge day car weighs 19½ tons, and can seat 56 passengers—an average of 696 pounds of car weight to one person.

Can sleeping cars be used?

Yes, with much greater advantage than on the wide gauge, because although people unknown to each other can generally, with some effort, be made to sit on the same seat, they cannot well be made to sleep in the same bed. The Denver and Rio Grande Company has not yet a length of road sufficient to require night travel, but when it has, sleeping cars will be introduced which will weigh less than 10 tons and accommodate 20 travelers.

How about speed and safety?

As before stated, the trains, both freight and passenger, run on the Denver and Rio Grande Railway at the same rate of speed as on all the wide gauge roads west of the Missouri River. It is to be hoped the good sense of the lines will prevent any general increase in their speed, at least to any extent; but trains have been run during the past year on the Denver and Rio Grande Railroad at 30 and even 40 miles per hour, and it is impossible to see why they cannot, if it becomes a necessity, increase their present rates as readily as on the wide gauge. The saving claimed for the larger wheels of the broad gauge line at high speed has been shown to be only a fraction of one per cent.

As regards safety, the cars are no more likely to upset than on the wide gauge, because the center of gravity has been greatly lowered. This is confirmed by the year's experience on the road. A car on the wide gauge road might, it is true, be made considerably wider than it commonly is without this danger, but that would require a broader and costlier road, and in the practical transaction of the carrying trade the unit of the gross business the car-load has proven to be already too large. It wants to be reduced rather than enlarged.

Is a positive advantage claimed from the reduction of the carrying capacity of a car below what it now is on wide gauge roads?

Yes, it so frequently has to go partially loaded in the practical every day working of the business that it would be better if it were smaller. It is well known how rarely a passenger car is full; although capable of seating 56, the cars probably do not average in the United States over 25 passengers to a car. In the heavy Pullman car it is but 15. It is the same with freight to some extent. The railroads in the United States carry at least four times as much total weight yearly as of freight load. If the car unit were smaller, much unnecessary hauling would be saved. For local trade especially, which constitutes the bulk of business on almost every American railroad, a great advantage would be gained, saving time, side-track room, beside dead weight. The capacity of the narrow-gauge car even exceeds the average actual load of the broad gauge car. It is better proportioned, therefore, to actual requirements, as these have manifested themselves in railroad experience and daily practice.

Is the power of the locomotive affected?

The experience had on the Denver and Rio Grande Railway, as that on the much narrower Festiniog Railroad, shows that it is certainly not diminished by the narrowing of the gauge. This power depends upon the amount of weight placed upon the driving wheels of the locomotive, which may be increased as desired—in other words, as the size of the train requires it.

Is not the length of the train increased by the necessity of using more cars for the same tonnage on the narrow gauge?

No; not in the case of the great bulk of articles which a railroad has to carry. For instance, the 16 wide gauge cars, cited before, carrying 160 tons, are each about 30 feet long, or 480 feet total; while the 20 narrow gauge cars, carrying the same load, are 24 feet long each, or 480 feet total. There may be an increase in length of train with the special class of light and bulky commodities, but if so, it is more than compensated for by the numerous occasions in which the cars are not fully loaded, when the narrow gauge gets the benefit of a much less length of car to the same load. In a year's business there would probably be no difference noticeable.

Nearly the same conditions exist in the case of passenger trains, as is shown by the following table:

LENGTH OF TRAIN REQUIRED TO SEAT 100 PASSENGERS.

KIND OF TRIAN.	Len'th of Passenger Cars to seat 100 passengers.	Len'th of Baggage Cars.	Length of Locomotive & Tender.	Total length of Train to seat 100 passengers.
	feet.	feet.	feet.	feet.
Broad gauge.....	96·42	44	53·33	193·75
Narrow gauge.....	111·11	40	35·33	186·44
In favor of narrow gauge ℔ 100 passengers...				7·31

It is to be regretted that the new and unorganized condition of the business on the road, with its constantly changing terminus, and mixture of construction and commercial transportation during the past year, has prevented the furnishing in detail of actual results sufficiently reliable to afford correct deductions as to the relative cost of operating the line in comparison with broad gauge. It is manifestly very difficult to make a just comparison with another road, as questions are involved of relative transportation charges, prices of labor, gradients, curves, amount of gross business, etc; but for the coming year an approximate deduction can probably be made. At the present time (April, 1873) the expenses in a business at the rate of about $4000 per mile per annum, are about 50 per cent. of the earnings, which, with ordinary labor at $2 per day, all skilled labor very high, supplies costly because of the remoteness from Eastern markets, gradients 75 feet per mile, curves, 6° per hundred feet, a new road bed, and small total business, must be considered as satisfactory. During the first year after its opening the expenses on the Kansas Pacific Railway were 79½ per cent. of its gross earnings.

The rates charged by the company are about the same as those in use on most of the Pacific railways, but less than those of the Denver Pacific.

At these rates it is believed the present rolling stock is capable of earning a yearly revenue of $750,000 on the main line of 118 miles, which increase will give a great reduction in the percentage of expenses.

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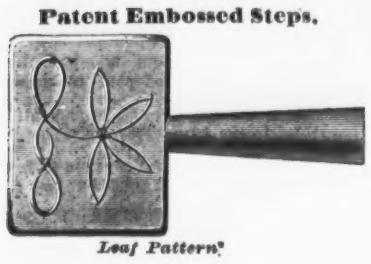
Patent Embossed Steps.

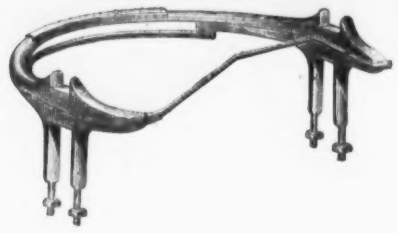


Leaf Pattern.

King Bolt Yokes.

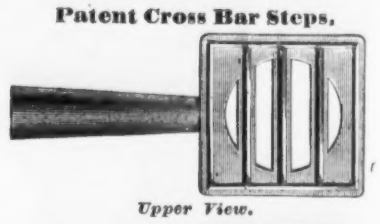
Established 1850.

No. 6 Fifth Wheels.



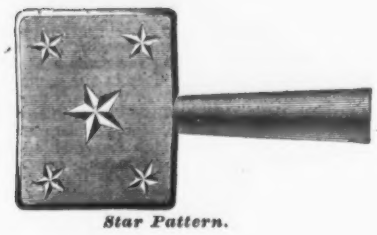
1871 Pattern Shaft Couplings.

Patent Cross Bar Steps.



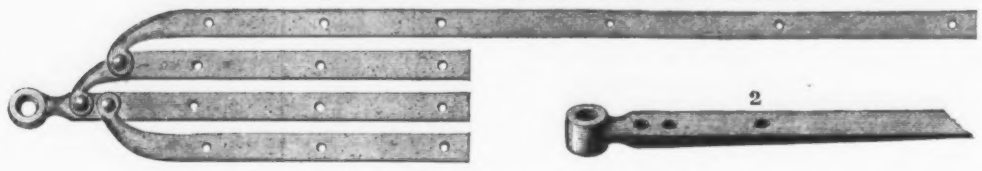
Upper View.

Lower View.

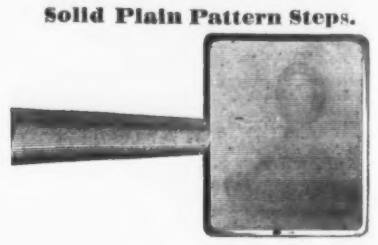


Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



Solid Plain Pattern Steps.



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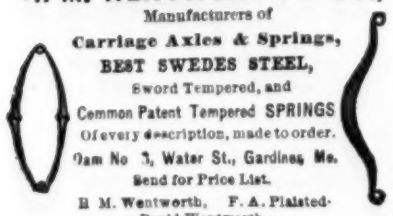

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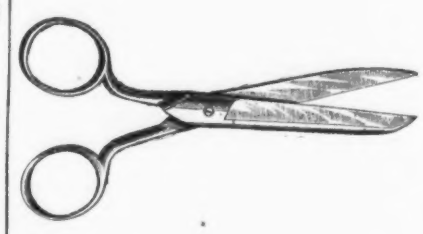

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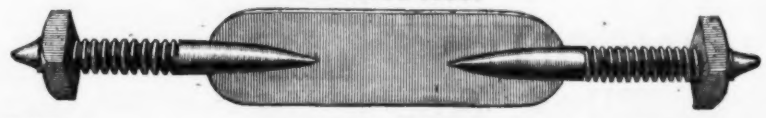

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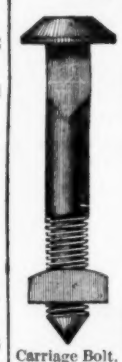

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Union Mfg. Co., 55 Chambers, N. Y....5

Cabinet Hardware, *Manufacturers of.*
Landers, Frary & Clark, 298 Broadway, N. Y....11

Carriage Bolts, *Makers of.*
Skelly T., 24th below Callowhill, Phila....12
Townsend, Wilson & Hubbard, Phila....12

Carriage Hardware, *Makers of.*
Hayden, Letchworth & Smith, Auburn, N. Y....12
Smith H. D. & Co., Plantaville, Ct....12

Car Wheels, etc., *Manufacturers of.*
Jackson & Woodin Mfg. Co., Berwick, Pa....4
Taylor Iron Works, High Bridge, N. J....6

Cash Drawer—Alarm, *Manufacturers of.*
Tucker & Dorsey, Indianapolis, Ind....16

Casters—Furniture, *Manufacturers of.*
Toler John, Sons & Co., Newark, N. J....36

Chains, *Makers of.*
Kendrick & Runkle, Trenton, N. J....14
Wyatt Thos., 771 Eddy, Providience, R. I....14

Cherry Stoners, *Makers of.*
D. H. Goodell, Antrim, N. H....10

Chisels, *Manufacturers of.*
Buck Bros., Millbury, Mass....17

Clothes Wringers, *Manufacturers of.*
Providence Tool Co., 11 Warren, N. Y....14

Coals, *Dealers in.*
Boyer L. S. & Co., 70 Broadway, N. Y....20

Coal, *Miners of.*
Pardee A. & Co., 111 Broadway, N. Y....20

Coal and Iron, *Dealers in.*
Persons B. W., 39 Weybosset, Providence, R. I....20

Coal Hods, *Manufacturers of.*
Easterbrook Wm., 311 Cherry, Phila....14
Smith Burns & Co., 45 Cliff, N. Y....24

Coffee and Spice Mills.
Lane Brothers, Millbrook, N. Y....24

Coffin Trimmings, *Makers of.*
Wayne Hardware Co., Cincinnati, O....10
Wilmarth W. D., Attleboro, Mass....16

Commission Merchants, *English.*
Goddard Samuel A. & Co., Birmingham, Eng....30

Compasses and Dividers, *Manufacturers of.*
Bemis & Call Hardw. & Tool Co., Springfield, Mass..13

Cooper's Tools, etc., *Dealers in.*
Little Chas. E., 59 Fulton, N. Y....14

Cordage, Rope, etc.
Allen's D. Sons, 136 Front, N. Y....36

Corrugated Stove Pipe Elbows, *Makers of.*
Corrugated Metal Co., East Berlin, Conn....4
Sellew Elbow Co., N. Y. and Chicago....13

Crucibles, *Manufacturers of.*
Newkumet Adam, 1537 N. Front, Phila....20
Joseph Dixon Crucible Co., Jersey City, N. J....36
Ross, Strow & Hoferkamp, 1433 N. 6th, Phila....36
Taylor, Strow & Co. Phila....36

Curry Combs, *Manufacturers of.*
Kellogg W. P. & Co., Troy, N. Y....16

Cutlery, *Importers of.*
Boker Hermann & Co., 101 Duane, N. Y....26
Bohnstedt-Kind (Solingen), 271 Canal, N. Y....
Dickinson Henry, 66 and 68 Reade, N. Y....11
Fisher Jos. S., 411 Commerce, Phila....11
King H. & J. W., 80 Chambers, N. Y....11
Peace Chas. Jr., 82 Chambers, N. Y....11
Ward Asline, 101 Duane, N. Y....11
Wilson Hawksworth, Ellison & Co., 80 John, N. Y....32
Smith & Hall, 50 and 60 Reade, N. Y....11
Taylor Thomas, 43 Chambers, N. Y....11

Cutlery, *Manufacturers of.*
American Knife Co., Thomaston, Conn....11
Burkinshaw Aaron, Pepperell, Mass....
Landers, Frary & Clark, 298 Broadway, N. Y....11
Miller Bros. Cutlery Co., W. Meriden, Conn....11
New York Knife Co., Walden, N. Y....11
U. S. Steel Shear Co., W. Meriden, Conn....12

Differential Pulley Blocks, *Makers of.*
Van Wart & McCoy, 43 Chambers, N. Y....35

Dredging, *and Makers of Dredging Machines.*
Am. Dredging Co., 214 S. Delaware ave., Phila....34

Drill Chucks, *Manufacturers of.*
Cushman A. F., Hartford, Conn....34
Hubbard & Curtiss Mfg. Co., 82 Chambers, N. Y....15

Drills (Hand), Blacksmith, *Makers of.*
Morrell & Tiebout, Williamsburgh, N. Y....26

Drilling Machines, *Makers of.*
Miller Falls Co., 78 Beekman, N. Y....25
Thorne & DeHaven, Philadelphia....34

Edge Tools, *Makers of.*
Bradley G. W., 37 Chambers, N. Y....8

Elevators, *Makers of.*
Otis Bros. & Co., 348 Broadway, N. Y....9

Emery Wheels, *Makers of.*
The Tanite Co., Stroudsburg, Pa....9
The Union Stone Co., 16 Exchange, Boston....9
Merrill E. C., W. Charleston, Vt....8

Enamelled and Plain Hollow Ware, *Mfgs. of*
Foxell & Jones, Troy, N. Y....

Engineers, Machinists, etc.
Henshall James, 1056 Beach, Phila....35
James Moore, cor. 19th and Buttonwood, Phila....34
Taws & Hartman, 1235 N. Front, Phila....34

Engines, Steam, *Makers of.*
Fishkill Landing Mch. Co., Fishkill-on-the-Hudson, N. Y....21
New York Steam Engine Co., 96 Chambers, N. Y....35
Paulding, Kemble & Co., 30 Broadway, N. Y....29
Whitehill, Smith & Co., Newburgh, N. Y....28
Wright J. W., 112 Spruce, Phila....35
Yale Iron Works, New Haven, Conn....35

Engravers, *Wood.*
Patterson Jas. S., 21 Spruce, N. Y....34
Roberts Wm., 36 Beekman, N. Y....16
Tuttle, D. H., 5 Beekman, N. Y....34
White H. R., 52 John, N. Y....15

Eyelets.
Union Eyelet Co., Providence, R. I....2

Faucets, *Self-Measuring, Makers of.*
Enterprise Mfg. Co., of Pa., Phila. and N. Y....30

Files, *Importers of.*
Carr J. & Riley, 82 John, N. Y....32
Dickinson Henry, 66 and 68 Reade, N. Y....9
Fisher Joseph S., 411 Commerce, Phila....9
Frasse Peter A. & Co., 95 Fulton, N. Y....8
Homer Foot & Co., Springfield, Mass....9
Moss F. W., 80 John, N. Y....32
Sanderson Bros. & Co., 16 Cliff, N. Y....32
Spear & Jackson, 98 Chambers, N. Y....36

Files, *Manufacturers of.*
Barnett G. & H., 41 and 43 Richmond, Phila....8
McCaffrey & Bro., 1732 and 1734 N. 4th, Phila....8
Nicholson File Co., Providence, R. I....8
Rothery John & William, 83 Chambers, N. Y....9
Wheeler, Clemson & Co., Middletown, N. Y....10

Filters,
John C. Jewett & Son, Buffalo, N. Y....24

Fire Arms, *Manufacturers of.*
Robinson M. W., 79 Chambers, N. Y....16
Schoverling & Daly, 84 Chambers, N. Y....16

Fire Brick, *Makers of.*
Bowman O. O. & Co., Trenton, N. J....30

Hall A. & Sons, Perth Amboy, N. J....20
Kreischer B., 58 Goerck, N. Y....20
Newkumet Philip, 23d and Vine, Phila....20
Palmer, Newton & Co., Albany, N. Y....20
Watson John R., Perth Amboy, N. J....20

Flint and Emery Paper and Cloth.
Cowdin Mfg. Co., 113 Chambers, N. Y....30

Fluting Machines, *Makers of.*
Lowerre & Tucker, Newark, N. J....34

Gage Cocks and Damper Regulators.
Murrill & Keizer, Baltimore, Md....35

Galvanized Iron.
Lefferts Marshall Jr., 94 Beekman, N. Y....4

Galvanized Wire.
Field Alfred & Co., 47 John, N. Y....3

Gate Hinges, Self-Closing, *Makers of.*
Clark & Co., Buffalo, N. Y....36

Glass, *Importers of.*
Downing A. C. & Co., 57 Beekman, N. Y....12
Hills, Turner & Harmon, 193 State, Boston....12

Glue Pots, Family, *Makers of.*
J. & E. Stevers Co., Cromwell, Conn....30

Grindstones.
McDermott J. & Co., Cleveland, O....9
Wood Walter R. & Co., 283 and 285 Front, N. Y....9

Gunpowder, *Makers of.*
Kneeland F. L. (Dupont) 70 Wall, N. Y....32
Laflin & Rand Powder Co., 21 Park Row, N. Y....32

Hammers, etc., *Manufacturers of.*
Emmet Hammer Co., Brooklyn, E. D., N. Y....15
Hammond C. & Son, 13 N. 5th, Phila....16
Minot & Co., Oliver, Boston....21

Hardware, *Brass and Galvanized.*
Tiebout W. & J., 290 Pearl, N. Y....2

Hardware, Commission Merchants.
Fernald & Sise, 100 Chambers, N. Y....8
Green R. M., 100 Chambers, N. Y....12
Graham & Haines, 88 Chambers, N. Y....30
Halsey J. E., 76 Reade, N. Y....28
Walbridge Geo. B., 55 Chambers, N. Y....26

Hardware Dealers.
Brown, Harris & Hopkins, 180 Greenwich, N. Y....14
Finney Thos. I. & Co., Vicksburg, Miss....16
Hubbard & Curtiss Mfg. Co., 82 Chambers, N. Y....30
Lloyd, Supplee & Walton, 625 Market, Phila....16
Louderback, Gilbert & Co., 53 Chambers, N. Y....31
Shepard Sidney & Co., Buffalo, N. Y....25
Turner, Seymour & Judds, 64 Duane, N. Y....8
Walsh, Coulter & Flagler, 83 Chambers, N. Y....11

Hardware Importers.
Beam & Murray, 54 Cliff, N. Y....26
Boker Hermann & Co., 101 Duane, N. Y....26
Field Alfred & Co., 47 John, N. Y....24
Hilger & Sons, 87 Chambers, N. Y....26
King H. & J. W., 80 Chambers, N. Y....9
E. Frith, 16 Cliff, N. Y....24
Louderback, Gilbert & Co., 53 Chambers, N. Y....31
Van Wart & McCoy, 43 Chambers, N. Y....24
Turnor R. A., 87 Chambers, N. Y....11
Wiebusch F., 84 Chambers, N. Y....26

Hardware Manufacturers.
Biddle Mfg. Co., 78 Chambers, N. Y....26
Cheritree T. F. & Co., 113 Chambers, N. Y....11
Corbin P. & F., 87 Chambers, N. Y....32
Durrie Horace, 97 Chambers, N. Y....28
Enterprise Mfg. Co., Phila....32
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y....17
Hubbard & Curtiss Mfg. Co., 82 Chambers, N. Y....15
Kellogg Wm. P. & Co., Troy, N. Y....24
Lane, Gale & Co., Troy, N. Y....8
Louderback, Gilbert & Co., 53 Chambers, N. Y....21
Many F. L. & Marshall, 48 Warren, N. Y....30
Middletown Tool Co., 82 Chambers, N. Y....28
Miller's Falls Mfg. Co., 78 Beekman, N. Y....20
Pratt & Co., Buffalo, N. Y....26
Providence Tool Co., 11 Warren, N. Y....14
Russell & Erwin Mfg. Co., 45 Chambers, N. Y....28
Schweitzer Mfg. Co., 57 Reade, N. Y....16
Shattuck W. F. & Co., 113 Chambers, N. Y....8
Stanley Works, 58 Beekman, N. Y....26
Taylor Mfg. Co., New Britain, Conn....24
Turner, Seymour & Judds, 64 Duane, N. Y....8
Union Mfg. Co., 55 Chambers, N. Y....5
Williams, White & Churchill, 73 Warren, N. Y....8
Wilson Mfg. Co., 37 Chambers, N. Y....23

Hardware Specialties.
Biddle Mfg. Co., 78 Chambers, N. Y....29
Haase John A., rear 116 Vanhorn, Phila....9
Holton F. G. & Co., 124 Walnut, Cincinnati, O....14
Louderback, Gilbert & Co., 53 Chambers, N. Y....31
Semple, Birge & Co., St. Louis....36

Helve Hammers, *Makers of.*
Bradley Mfg. Co., Syracuse, N. Y....29

Hoisting Engines, *Makers of.*
Otis Bros. & Co., 348 Broadway, N. Y....8

Horse Nails, *Makers of.*
Ausable Horse Nail Co., 35 Chambers, N. Y....36
Brundage & Co., Middletown, N. Y....10
Globe Nail Co., Boston, Mass....36
Pratt & Co., Buffalo, N. Y....26
Putnam S. S. & Co., Neponset, Mass....8

Horse Shoes, *Makers of.*
Burden Iron Works, Troy, N. Y....4

Hubs and Spokes, *Mfrs. of.*
Gleason J., 2nd and Diamond, Phila....12

Hydraulic Jacks.
Dudgeon Richard, 24 Columbia, N. Y....35

Ice Cream Freezers, *Makers of.*
Blatchley C. G., 506 Commerce, Phila....31
Shepard Sidney & Co., Buffalo, N. Y....25
Torry E. S. & J., 166 Fulton, N. Y....24

Insurance, Boiler.
Hartford Steam Boiler and Inspection Co....13

Insurance Fire and Marine.
National Fire Ins. Co., 52 Wall, N. Y....34

Iron Brokers.
Boynton Geo. A., 70 Wall, N. Y....6
Hazard & Jones, 212 Pearl, N. Y....4
Petit Wm. H., 72 Wall, N. Y....4

Iron, Corrugated, *Manufacturers of.*
Corrugated Metal Co., East Berlin, Conn....15

Iron, Charcoal, *Warm or Cold Blast.*
Quincy John W., 98 William, N. Y....4

Iron Commission Merchants.
Blakiston & Cox, 333 Walnut, Phila....6
Hand Jas. C. & Co., 614 and 616 Market, Phila....8
Hoopes W. Graham, 419 Walnut, Phila....6
Malin Bros., 228 Dock, Phila....6

Iron, Pig, *Importers of.*
Williamson James & Co., 69 Wall, N. Y....4

Iron Dealers.
Abeel Brothers, 190 South, N. Y....4
Bonnell, Botsford & Co., Youngstown, O....4
Borden & Lovell, 70 and 71 West, N. Y....4
Buchanan Geo., 19 Birchen Lane, London, E. C....6
Cleveland, Brown & Co., Cleveland, O....6
Coddington T. B. & Co., 25 Cliff, N. Y....4
Conklin & Huerstel, 99 Market Slip, N. Y....4
Davidge & Wheeler, 78½ Pine, N. Y....4
Fuller, Lord & Co., 139 Greenwich, N. Y....4
Fuller, Dana & Fitz, 110 North, Boston....2
Gardner Wm., 575 Grand, N. Y....4
Hall, Kimbark & Co., Chicago....4
Harrison & Gilloon, 558 to 562 Water, N. Y....4
Hart E. R. & G. A., 208 Walnut, Phila....6
Jackson & Chase, 206 and 208 Franklin, N. Y....4
Judson B. F., 457 and 459 Water, N. Y....4
Matthews Chas. W., 132 Walnut, Phila....6
Packard, Goff & Co., Youngstown, O....4
Piersons & Co., 24 Broadway, N. Y....4
Pope Thos. J. & Bro., 292 Pearl, N. Y....6
Quincy John W., 98 William, N. Y....4
Richards D. W. & Co., 92 Mangin St., N. Y....4
Smith Gam'l G. & Co., 342 Pearl, N. Y....4
Warner A. B. & Sons, 28 and 29 West, N. Y....4
Williamson James & Co., 69 Wall, N. Y....4
Whitney Alfred R., 58 Hudson, N. Y....4

Iron, *Manufacturers of.*
Atwater, Wheeler & Co., New Haven, Conn....6
Cushong & Co., 31 Beekman, N. Y....15
Britannia Iron Works, Middlesbro', Eng....6
Burden Iron Works, Troy, N. Y....6
Cartwright, McCurdy & Co., Cleveland, O....6
Cleveland Rolling Mill Co., Cleveland, O....6
Coffin Wm. E. & Co., 8 Oliver, Boston....4
Ellis W. R. & Co., 17 Batterymarch, Boston....4
Everson, Graff & Macrum, Pittsburgh, Pa....4
Fulton S. & Co., 412 Walnut, Phila....6
Jones & Laughlins, Pittsburgh, Pa....4
Leonard John, 450 & 451 West st., N. Y....4
Lynchburg Iron Works, Lynchburg, Va....4
Milwaukee Iron Co., Milwaukee, Wis....6
Niles Iron Co., Niles, O....6
New Haven Rolling Mill Co., New Haven, Ct....6
Old Dominion Iron & Nail Works Co., Richmond, Va. 6
Oxford Iron Co., 81 Washington, N. Y....4
Phœnix Iron Co., 410 Walnut, Phila....6
Rowland Wm. & Harvey, Phila....36

Iron, Hoop. *Manufacturers of.*
Wm. Clark & Co., Pittsburgh, Pa....4

Iron, Swedish, *Importers of.*
Jessop Wm. & Sons, 91 and 93 John, N. Y....32
Mitander Nils, 69 William, N. Y....4
Page Ewd. & Co., Boston, N. Y. and Phila....4

Lace Leather, *Manufacturers of.*
Stoyle Wm. H., 408 Library, Phila....12

Lanterns, *Manufacturers of.*
Howard & Morse, 45 Fulton, N. Y....2

Lawn Mowers, *Manufacturers of.*
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y....29

Lead and Tin Lined Lead Pipe, etc., *Mfrs.*
Colwell, Shaw & W. Mfg. Co., 213 Centre, N. Y....2

Locks, *Manufacturers of.*
Norwich Lock Co., Norwich, Conn....15
Romer & Co., Newark, N. J....36
Sargent, Greenleaf & Cole, 300 Broadway, N. Y....14
Trenton Lock Co., 48 Warren, N. Y....30
Yale Lock Mfg. Co., 226 Broadway, N. Y....26

Machinery, *Makers of.*
Billings & Spencer Co., Hartford, Conn....17
Fishkill Landing Mch. Co., 68 Bleecker, N. Y....21
Mason V. W. & Co., Providence, R. I....35
Chapin Machine Co., New Hartford, Conn....30
Paulding, Kemble & Co., 30 Broadway, N. Y....17
Pratt & Whitney Co., Hartford, Conn....34
Sellers Wm. & Co., 1600 Hamilton, Phila....34
Watson Andrew, 537 Dickinson, Phila....36
Whitehill, Smith & Co., Newburgh, N. Y....28

Machine Screws, *Makers of.*
Lyon & Fellows Mfg. Co., Williamsburg, N. Y....16

Machinists' Tools, *Makers of.*
Blaisdell P. & Co., Worcester, Mass....35
Blundell Henry & Co., Providence, R. I....35
Harrington Edwin, 15th st. and Pa. ave., Phila....35
Lincoln Geo. S. & Co., Hartford, Ct....34
Putnam Machine Co., Fitchburg, Mass....34

Malleable Iron Castings, *Makers of.*
Tower Daniel L., Elizabethport, N. J....6

Meat Cutters, *Makers of.*
Whittemore D. H., Worcester, Mass....20

Metal Dealers and Brokers.
Belknap Aug., 48 Cliff, N. Y....2
Coddington T. B. & Co., 25 and 27 Cliff, N. Y....2

Cragin Bros. & Co., 141-5 Lake, Chicago, Ill....2
Crane U. O., 104 John, N. Y....2
Harnickel Max, 85 Beaver, N. Y....2
Phelps, Dodge & Co., Cliff, bet. John & Fulton, N. Y. 2
Pope Thos. J. & Bro., 292 Pearl, N. Y....2
Quincy J. W., 98 William, N. Y....2
Thomson A. A. & Co., 213 and 215 Water, N. Y....2
Van Wart & McCoy, 43 Chambers, N. Y....2

Metallurgists.
Britton J. Blodgett, 339 Walnut, Phila....14
Drown Thomas M., 1123 Girard, Phila....14
Henderson James, 30 Broadway, N. Y....14
Maynard & Van Rensselaer, 24 Cliff, N. Y....14
School of Mines, E. 49th, N. Y....14

Mining and Railroad Tools, &c., *Makers of.*
Washoe Tool Mfg. Co., 61 Park Place, N. Y....31

Molders' Tools.
Carter H. & Sons, 290 Pearl, N. Y....9

Mower and Reaper Knives, *Makers of.*
Simond's Mfg. Co., Fitchbury, Mass....12

Monuments, *Granite and Bronze.*
National Fine Art Foundry, 218 E. 25th....6

Mouse Traps, *Makers of.*
Dietz R. E., 54 and 56 Fulton, N. Y....36

Nickel Platers.
Smith L. A., 42 Mechanic st., Newark, N. J....31

Norway Shapes, *Rollers of.*
Rowland Wm. & Harvey, 946 Beach, Phila....36

Note Broker.
Gallaudet P. W., 3 and 5 Wall, N. Y....20

Nuts, Bolts, etc., *Makers of.*
Ætna Nut Co., Southington, Conn....14
Arms, Bell & Co., Youngstown, O....14
Carpenter David, 402 Water, N. Y....4
Clark Bros. & Co., Millsdale, Conn....12
Fuller, Lord & Co., Boonton, N. J....4
Haskell W. H. & Co., Pawtucket, R. I....14
Lewis, Oliver & Phillips, Pittsburgh and N. Y....14
Plumb, Burdict & Barnard, Buffalo, N. Y....36
Rhode Island Nut Co., 11 Warren, N. Y....14
Sternbergh J. H., Reading, Pa....14

Oilers, *Makers of.*
White J. H., Newark, N. J....36

Ore Crushing Machines, *Makers of.*
Blake Crusher Co., New Haven, Conn....34

Paints and Oils, *Dealers in.*
Devoe F. W. & Co., 117 Fulton, N. Y....
N. Y. Enamel Paint Co., 43 Chambers, N. Y....29

Patent Solicitors.
Howson & Son, Phila. and Washington, D. C....9
Leggett & Leggett, Washington, D. C....8
Whitney J. A., 128 Broadway, N. Y....9

Picture Nails, etc., *Manufacturers of.*
Richards T. C. & Co., 47 Murray, N. Y....20

Pipes, Fittings, etc., *Makers of.*
Eaton & Cole, 58 John, N. Y....30
McNab & Harlin Mfg. Co., 56 John, N. Y....30
Nelson, Finkel & Co., 439 E. 10th st., N. Y....30
Pancoast & Maule, 227 Pear, Phila....30
Chas. Gregg Mfg. Co., 62 and 64 Gold, N. Y....30

Pipe, Water and Gas, *Makers of.*
Brick R. A. & Co., 112 Leonard, N. Y....6
Graff William & Co., Pittsburgh, Pa....30
Starr Jesse W. & Sons, Camden, N. J....6
Warren Foundry & Mach. Co., Phillipsburg, N. J....30
Wood R. D. & Co., 173 Broadway, N. Y....6

Plane Irons, *Manufacturers of.*
Middletown Tool Co., Middletown, Conn....9
Sandusky Tool Co., Sandusky, O....30

Planes, *Manufacturers of.*
Greenfield Tool Co., Greenfield, Mass....14
Sandusky Tool Co., Sandusky, O....30
Stanley Rule & Level Co., 55 Chambers, N. Y....9

Plumbago Lubricator.
N. Y. Black Lead Works, 172 Forsyth, N. Y....

Plumbers' Materials, *Manufacturers of.*
Carr Wm. S. & Co., 106 Centre, N. Y....30

Presses, Power. *Makers of.*
Am. Saw Co., 1 Ferry, N. Y....36
Peck Milo & Co., New Haven, Ct....28
The Stiles & Parker Press Co., Middletown, Ct....35

Pressure Blowers. *Makers of.*
Sturtevant B. F., 72 Sudbury, Boston....35

Printing Presses, *Makers of.*
Woods Benj. O., 351 Federal, Boston....16

Publishers.
Burr J. B. & Hyde, Hartford, Conn....10

Pumps, *Makers of.*
W. S. Blunt, 86 Beekman, N. Y....5
Douglas W. & B., Middletown, Conn....5
Rumsey & Co., Seneca Falls, N. Y....5
Union Mfg. Co., 55 Chambers, N. Y....5
Valley Mch. Co., Easthampton, Mass....5

Rails, *Importers of.*
Congreve Chas. & Son, 104 and 106 John, N. Y....32
Hopkins S. W. & Co., 57 Broadway, N. Y....4
Smith Gilead A. & Co., 62 Broadway, N. Y....4

Rails, Iron or Steel, *Makers of.*
Atkins Bros., Pottsville, Pa....6
Cambria Iron Co., Johnstown, Pa....6
Cleveland Rolling Mill Co., Cleveland, O....6
Griswold John A. & Co., Troy, N. Y....33
Milwaukee Iron Co., Milwaukee, Wis....6
Springfield Iron Co., Springfield, Ills....4
Joliet Iron & Steel Co., Joliet, Ills....6

Razor Straps, *Makers of.*
B. F. Badger, 51 Elm, Charlestown, Mass....16

Rock Drills, *Makers of.*
Burleigh Rock Drill Co., Fitchburg, Mass....35

Rolling Mill Machinery, etc., *Manufacturers of.*
Moore James, Cor. 16th and Buttonwood, Phila....34

Rolls, Chilled and Sand, *Makers of.*
Garrison A. & Co., Pittsburgh, Pa....4

Rules, *Manufacturers of.*
Chapin E. M., Pine Meadow, Ct....5

Sash, Blinds, etc., *Makers of.*
Keogh & Thorn, 254 Canal, N. Y....35

Sash Locks, *Makers of.*
Clark & Co., Buffalo, N. Y....36

Saws, *Makers of.*
Atkins E. C. & Co., Indianapolis, Ind....10
American Saw Co., 1 Ferry, N. Y....10
Boynton E. M., 80 Beekman, N. Y....10
Cheritree T. F. & Co., N. Y....11
Eccles James, 2423 Lombard, Phila....10
Flint J., Rochester, N. Y....10
Disston Henry & Sons, Phila....10
McNeice Wm., 515 Cherry, Phila....10
James Ohlen, Columbus, O....10
Peace Harvey W., Williamsburg, N. Y....10
Spear & Jackson, 116 Duane, N. Y....36
Wheeler, Madden & Clemson, Middletown, N. Y....10
Woodrough & McParlin, Cincinnati, O....10
Worrall & Co., 28 Elm, N. Y....10

Saw Frames, Wood, *Makers of.*
Peace Harvey W., Williamsburg, N. Y....10

Scales, *Manufacturers of.*
Brandon Mfg. Co., Brandon, Vt....9
Fairbanks E. & T. & Co., 311 Broadway, N. Y....9
Patterson Bros., 27 Park Row, N. Y....36
Riehle Bros., 9th near Coates, Phila....9
Shattuck W. F. & Co., 113 Chambers, N. Y....8

Scissors, *Manufacturers of.*
Rowe & Post, 120 Chambers, N. Y....11
U. S. Steel Shear Co., W. Meriden, Ct....12

Screws, *Makers of.*
Miles F. S., 205 Quarry, Phila....26

Screws, *Importers of.*
Bruce Geo. W., 1 Platt, N. Y....31
Field Alfred & Co., 47 John, N. Y....13

Shovels, &c.
Clement & Hawkes Mfg. Co., Northampton, Mass....14

Smelting Works.
Du Plaine & Reeves, 760 S. Broad, Phila....36

Stamped and Japanned Tin Ware.
Farrington J. D., Jr., 38 Murray, N. Y....25
Shepard Sidney & Co., Buffalo, N. Y....25
Sturges Frank & Co., Chicago, Ills....25

Steam Hammers, etc., *Makers of.*
Dudgeon Richard, 24 Columbia, N. Y....35
Ferris & Miles, 24th and Wood, Phila....36

Snaps, Harness, *Makers of.*
Middletown Tool Co., Middletown, Conn....9

Speed Indicators, *Makers of.*
Connecticut Cutlery Co., Naugatuck, Conn....31

Squares, Steel and Iron, *Makers of.*
Hart, Bliven & Mead Mfg. Co., 243 Pearl, N. Y....32

Steam Gauges, Recording, *Makers of.*
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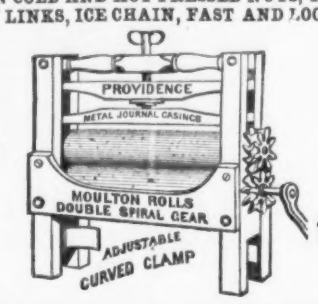

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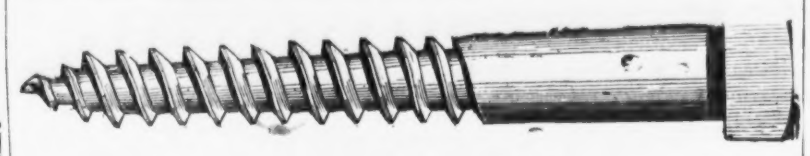

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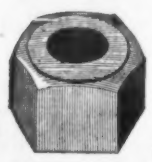

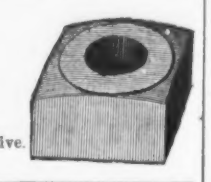

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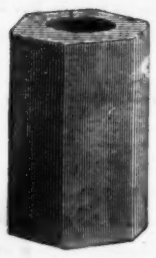

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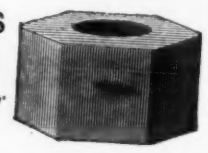

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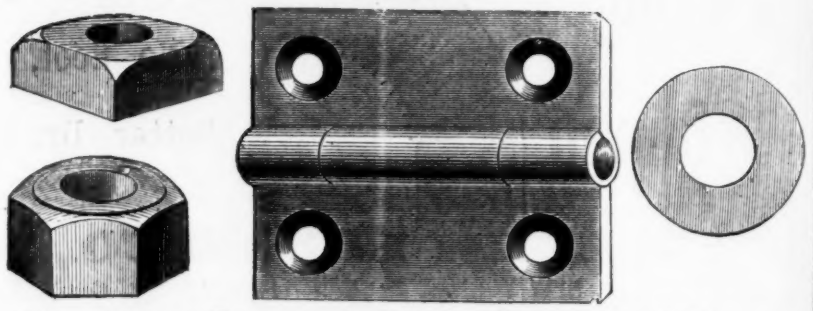

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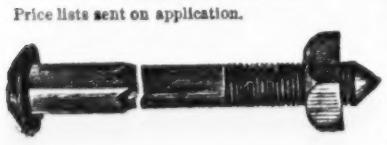

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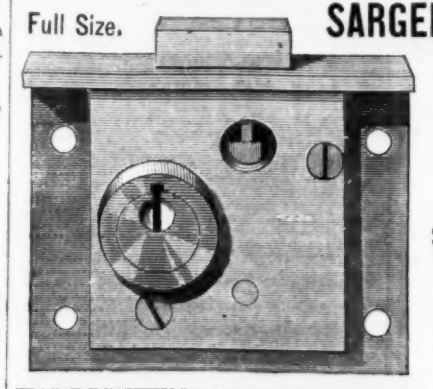

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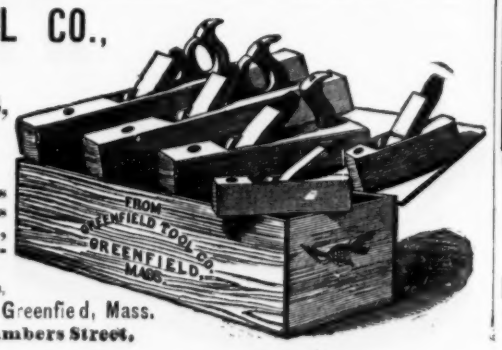

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Steam Road Roller and Traction Engine.

To the Editor of The Iron Age:—SIR: I claim to be the inventor of all that is new in the steam road roller and traction engine, represented in your journal of June 19 as patented by Anders Lindelof. I exhibited drawings and a photograph of one built at the Morgan Iron Works, at the fair of the American Institute, two years ago. The one built was from my design, modified by making it with a one-cylinder engine, double geared, instead of a two-cylinder engine single geared, as the drawing and photograph showed. Your description does not specify what is claimed as original; but Mr. Lindelof informed me that his patent claims only the joint between the steering spindle and the fork that connects to the gudgeons of the front roller. I put a joint performing essentially the same function on four self-propelling fire engines, which were built at the Novelty Works in 1857, and Mons. Colt put a like one of a road locomotive which was illustrated in *Engineering*, Nov. 12, 1869, and I am unable to see a trace of originality, that is not my own, in the machine you published. I did not patent my design, and any one has a right to build it, as it was built by the Morgan works, and as I exhibited it at the fair. As to the claim that it has power to adapt itself to uneven surfaces more than other rollers and traction engines, I do not see the ground for it; all the road steamers and rollers I know of have that power. And as to the advantage of a single roller, as distinguished from the English rollers used here, it was in my design, as exhibited; and as it may be seen by any one who will call on me. The steel gearing and wrought iron rollers are not subjects of a patent or matters of invention; and every one understands the advantages of them, and whether those advantages are worth the costs. So with the notions about the weight of rollers; they are unsupported by facts or arguments, and are not new; and, in my opinion, based on observations of the working of the heavy self-propelling fire engines on soft ground, they are wholly erroneous. Those fire engines pressed with 1600 pounds on each inch width of tire, and did not "dig into the ground" in the Novelty Works yard, which was made ground, and softer than is usually found where roads are made. It is true that in a few cases Aveling & Porter's rollers have dug in, but that was owing to something beside weight, which I have avoided. The notion put forth by this "patentee," and by Aveling & Porter, that light rollers are preferable to heavy ones, will, if adopted, prevent the full advantage of this useful aid in road making.

In the *American Artisan*, of March 29, is an extract of a letter from the president of the company that owns the roller built from my design, in which he says it is better than the foreign built rollers he has seen. And in the *Engineer*, Dec. 8, 1871, is a *new* road roller, by Aveling & Porter, in which they have abandoned their chain driving gear. These indicate that I may possibly know something on this subject, although I have not thought it worth while to get a patent, and go to the directors of parks for patronage.

J. K. FISHER, 30 Broadway.

New Rolling Mill and Furnace Enterprise in Westmorland Co., Pa.

We take the following from the Pittsburgh *Commercial:*

Messrs. Everson, Graff & Macrum, owing to the encroachmments made on their premises by the Connellsville Railroad, and the difficulty of obtaining, within the city limits, an area of ground large enough and of suitable location for their growing business, determined some time since to remove one branch, at least, of their extensive works to some locality where they would have ample room. After examining a great many places, they selected Fountain Mills, on Jacobs Creek, Westmoreland county, where the Southwestern Pennsylvania and Broadford and Mount Pleasant Railroads intersect each other. Here they purchased some three hundred acres of land, one hundred and twenty-five of which are underlaid with a nine feet vein of coal. In addition to the coal there is an abundance of limestone on the place, whilst natural ore, yielding from 33 to 45 per cent., can be obtained in the almost immediate neighborhood in any quantity desired. The work of erecting their new rolling mills was commenced in the month of August last year, and before the beginning of the present year the company were manufacturing iron. For about five months they have been testing and experimenting with their machinery, and now have it about as nearly perfect as it can be made. They have availed themselves of all the modern improvements, and competent judges have pronounced the establishment of Messrs. Everson, Graff & Macrum to be one of the most perfect and complete sheet iron rolling mills they have ever seen.

The mill in which, for the present, sheet iron will be manufactured exclusively, is two hundred and twenty five feet long and one hundred and fifty feet wide, and has a capacity for turning out twenty-four tons per day. There is sufficient room, however, to greatly increase its dimensions and capacity, as the ground between the Southwestern Railroad and the creek embraces an area of about twenty acres.

In the matter of fuel alone the enterprising company will realize a handsome profit in the year. Fuel in the city cost them nearly $50,000 per annum. Now the pit is within about one hundred rods of the works, and the coal is distributed at any and every place required in the mill, without the aid of either horses, mules or steam. Self-protection and self-aggrandizement would prompt us to say that Pittsburgh capital should not be used to enrich Westmoreland and Fayette (for the property of the company is in both counties), still we congratulate Messrs. Everson, Graff & Macrum on securing such an eligible, convenient and economical site, and rather exult that capitalists of Allegheny county have built for Westmoreland the first rolling mill she could ever boast of. Fountain Mills, for we suppose the name will not be changed, although there is a great difference between the "material" manufactured there formerly and that which is now produced, will be claimed as a Pittsburgh institution. The property, buildings and machinery will involve an outlay of something in the neighborhood of four hundred thousand dollars, which must prove of immense advantage to the neighborhood and surrounding country. Buildings are already rising up by the dozen, and lots are in good demand.

We must not omit to mention that the mill was built by those well known builders and contractors, Messrs Wm. Boyd & Son, 214 Sandusky street, Allegheny, and that the work which they have done gives entire satisfaction to the company. These gentlemen have reared for themselves many monuments of architectural honor in these cities and vicinity, such as the Dollar Savings Bank, the First National Bank, and many other edifices to which both they and we can point with pride. Mr. Thomas Boyd, the junior member of the firm, is government architect, and has been in close consultation for the past few days with A. B. Mullet, Esq., United States supervising architect, who has visited our city to give council to the commission appointed to select a site for the new government buildings. The firm is so well and so personally known that it requires no commendation at our hands.

On the same property Messrs. Everson, Knap & Co. are erecting a large furnace, which will be ready to go in blast about the 1st of August. It is 16½ feet bosh and 65 feet high, and will have a capacity of from 40 to 50 tons per day. It is built on the modern principle, and is similar to the famous "Isabella" and "Lucy" furnaces at Sharpsburgh and Hatfield. It has been named the "Charlotte," in honer of Miss Charlotte Macrum. From what we have stated above in regard to the abundant supply of coal, limestone and ore, which can be obtained on the premises and in the immediate vicinity, it will be seen that no more convenient place could be obtained for the purpose.

Coal Dust as a Fuel for Locomotives.

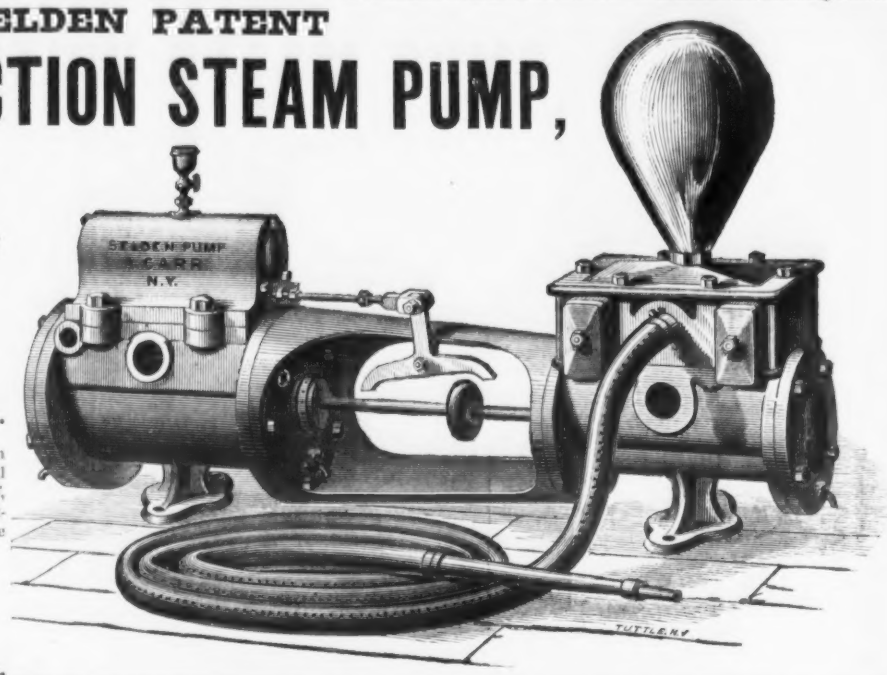
Mr Alfred Berney, of Jersey City, has lately perfected an invention for burning anthracite coal dust in locomotives, which is well spoken of. He finds by repeated experiments that it is best to use bituminous or soft coal and anthracite dust separately, in such proportions as may be required to keep the steam up to the necessary working point, and to prevent a waste of steam by blowing off. The fine dust is the best and cheapest, as pea coal is now in demand at fair prices, so much so that mining companies are rescreening their old coal dust heaps to get it out. He claims that the pea coal does not burn quickly, but lies dead upon the grates, but the dust ignites and burns almost instantaneously.

He divides the tender into two nearly equal parts by a partition, so that the dust and coal can be readily reached by the firemen. In one division he stores the bituminous or soft coal, and in the other he places the anthracite coal dust. Both the coal and the dust may be saturated with water, or not, as may be desired. With improved spark arresters it is not necessary to wet the fuel. He starts the fire in a locomotive fire box in the usual manner, with wood and bituminous coal, taking care to add no dust until the steam is up to one hundred pounds pressure, or until the exhaust may be used to aid the draft. As soon as the engine is started the anthracite coal dust may be used in such proportions as the requirements of the train permit. He directs that the grates be well shaken every fifty minutes, firing the engine in the usual manner as far as the coaling is concerned. He claims that his experiments demonstrate that about one-half each of coal and dust can be burned to advantage, and that the fuel can be mixed before being put on the tender, in that proportion. He prefers, however, not to mix it, but to use each kind as a greater or less quantity of heat may be required, as some locomotives steam much freer than others, and as with some the speed is slow and the stoppages long and frequent, too much steam not only compels the boiler to blow off, but also strains it and wastes fuel. Engineers are also frequently compelled to haul heavy trains at great speed to make up for delays at stations or to meet the requirements of the time-tables. In such cases a greater proportion of the bituminous coal must be used, and a less proportion of the dust; it is, therefore, obvious that it is better to leave the proportioning of the different kinds of fuel to the engineer. Short accommodation trains, after the fire has started as above described, may run twenty-five miles by using the coal dust alone or with but a mere trifle of soft coal.

In order to make this invention work satisfactorily and cheaply, it is advisable to use on the same boiler a good feed-water heater, a long fire-box, a fire-grate, raised up to the same pitch as with the anthracite coal burning boilers, a spark, gas, smoke, and heat conductor, a well perforated door, and a combustion or oxygen heating chamber, as by these appliances, or any of them, much economy is gained, and more speed can be made with the dust, and much less bituminous coal used. It is stated that the saving of costly bituminous coal by the use of anthracite dust, as already shown upon several roads in Massachusetts and Rhode Island, will be enormous. It is claimed that anthracite dust has as much heating and steam producing power as bituminous coal, pound for pound, and is really less objectionable to use, on account of the smoke and smell.

THE BUSHONG
PIG IRON,
Manufactured by *BUSHONG & CO.*,
A Supply on Iron Dock, Hoboken. READING, PA.
H. D. BENJAMIN, Agent,
31 Beekman St., 2nd Floor, front, NEW YORK.

SELDEN PATENT
DIRECT ACTION STEAM PUMP,



Patented August 2nd and December 20th, 1870.
Tank Pump, with Boiler Feed Attachment.
For Boiler Feeders,
For Water Works,
For Fire Pumps,
For Mines, etc, etc.
And for all purposes for which Steam Pumps can be used. Sold under full guarantee. Money will be returned if, from any cause, they should prove unsatisfactory. Send for Circular and Price List, fully describing them, to
A. CARR,
43 Cortlandt Street,
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PYROMETERS
for BLAST FURNACES.
E. BROWN'S STANDARD PORTABLE,
E. Brown's Improved Gauntlet

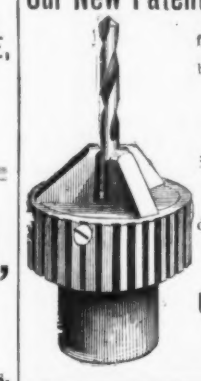
Edw. BROWN,
311 Walnut St., Philadelphia.
ALSO FOR SALE
PYROMETERS
For Baker's Ovens, Boiler Flues, Galvanizing Baths, Oil Stills, Vulcanizers, Superheated Steam.
E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

Over 200 Gauntlets and 60 Portable Pyrometers are now in use at Blast Furnaces.
Circulars on application.

EMMET HAMMER CO.,
Manufacturers of all kinds of
Hammers and Sledges,
AND
Contractors' Tools,

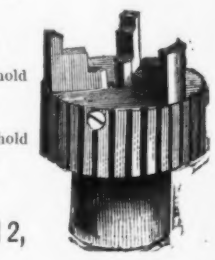
Brooklyn, E. D., New York.

The Hubbard & Curtiss Mfg. Co.,
No. 82 Chambers St., N. Y., Manufacturers of
Our New Patent Improved Self-Tightening Drill Chuck, Victor No. 3.



The cut at the right shows the extra set of jaws which we furnish when ordered, at $2·00.
They can be used for chucking small articles for turning, boring, &c., from 0 to 1⅝.
The jaws can be changed in three minutes.

The best Chuck in the Market!
All its parts are of Cast Steel. Warranted to hold ⅛ to 0 drills with the clasp of the hand.
Price - - - - - $8·00.
Extra Jaws - - - - - 2·00.
No. 4 VICTOR CHUCK, same principle as No. 3, will hold drills from ⅜ shank down to ⅛ inch.
Price - - - - - $10·00.
Extra Jaws - - - - - 2·50.
Also, manufacturers of our
UNIVERSAL DRILL CHUCKS, No. 1 and 2,
AND OTHER
Machinists' Tools.



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Salesrooms:
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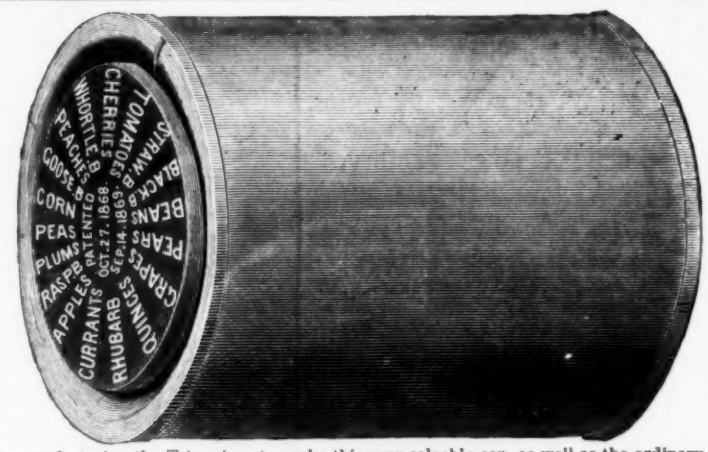
88 Chambers St., N. Y. John C. Brenner, Son & Co., 21 North 5th St., Phila.

Self Labeling Fruit Can.



We are manufacturing the Trimmings to make this very saleable can, as well as the ordinary ones. Size of cover, 3¼ inches. Has an unprecedented sale. Send in your orders early.
We are also making a very large line of Kitchen Furnishing Goods, in
Stamped, Japanned and Tinned Iron Ware.
Quality unsurpassed.
FRANK STURGES & CO.,
Importers and Manufacturers,
72, 74 and 76 Lake Street, CHICAGO.

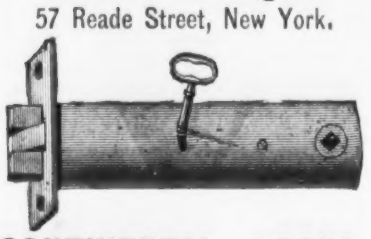
GET BINDERS
FOR
THE IRON AGE.
We have made arrangements to furnish
KOCH'S PATENT BINDERS,
proper size for filing The Iron Age for six months, at the following rates:

Half Cloth	- - -	$1·00 each.
Full "	- - -	$1·50 "
Half Roan	- - -	$1·75 "
Half Morocco	- -	$2·00 "

David Williams,
10 Warren St., N. Y.

Schweitzer Mfg. Co.,

57 Reade Street, New York.



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Made of Wrought Iron or Brass, very superior in quality, and only an auger used in mortising.

EXCELSIOR PAD LOCKS,
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" DIVIDERS,

ALL WITH

STUBS' STEEL POINTS,

Best and Cheapest Goods in the market. Sole Agents for the United States for

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Emery, Waterhouse & Co., Shovels & Spades.

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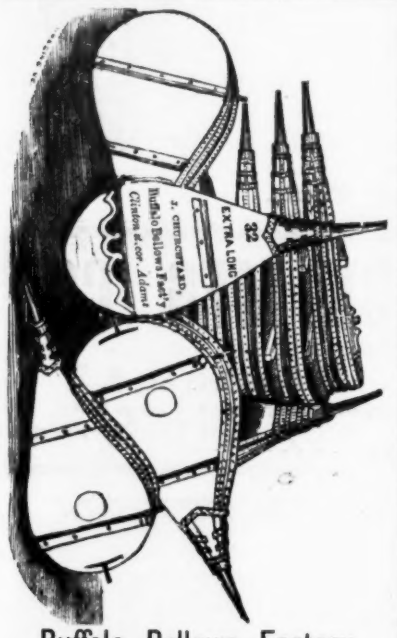
Price List sent free on application.



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Clinton cor. Adams Street, **Buffalo, N. Y.**

Do your own Printing with a **Novelty Printing Press,** the best yet invented for amateur and business purposes, and unsurpassed for general job printers. Over 8000 in use. **Benj. O. Woods,** Manufacturer and Dealer in every description of Printing Material. 349-351 *Federal* & 152 *Kneeland St's, Boston. Branch Office,* 543 *Broadway* & 88 *Mercer St., N. Y. Agents, Kelly, Howell & Ludwig, Philadelphia, A. C. Kellogg, Chicago, Ill.* Send for a new Illustrated Pamphlet.

James M. Berry, Newmarket, N. H., Writes Nov. 25th, 1872.—I think the Novelty is the best press yet invented; I am certain that it can be worked at a much greater rate of speed and do better work than any other amateur press.

Wm. A. May, Chicago & Canada R. R. Co., Morenci, Mich., Writes Jan. 10th, 1873.—I have recently been doing some very fine work on my little Novelty, in fact, quite throwing the "regular" job offices in the shade.

T. J. Turley, Franklin, Tenn., Writes Nov. 6th, 1872.—Some months ago I purchased one of your Duodecimo Novelty Presses, and I am happy to say that it works admirably and far exceeds my most sanguine expectations in the manner it does its work.

A. S. K. Holbrook, Ogdensburg, N. Y., Writes Nov. 26, 1872.—My Novelty does work equal to that of the best offices in this city.

P. P. Mast & Co., Buckeye Agricultural Works, Springfield, Ohio, Write July 29th, 1872.—Our Novelty Press works to our entire satisfaction.

Oscar F. Black, Vergennes, Vt., Writes Dec. 16th, 1872.—My Novelty works splendidly.

F. H. Pinkham, New Market, N. H., Writes Aug. 9th, 1872.—I like my "Novelty" better and better every day; I am surprised at the speed with which I work it.

J. A. Morrill, Fulton, N. Y., Writes Nov. 25th, 1872.—The Duodecimo Novelty Press which I purchased about two weeks ago works splendidly; cards printed on it seem as fine as engraved.

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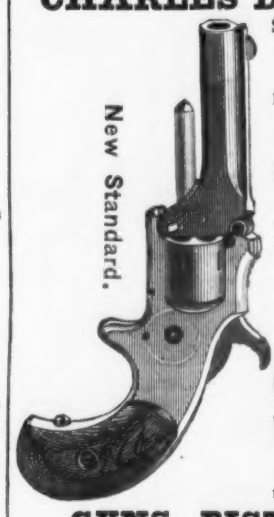
CHARLES DALY Breech Loading Guns.

Side Snap, Golcher and Scott Systems,

Equal in every respect to the highest priced. Send for Illustrated Catalogue.



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Quality, first-class; style, similar to Smith & Wesson; price, $2·50 to $3·00 less.

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Single Cartridge Pistols.

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Celebrated Breech Loaders,

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Revolver; Wrought Iron Frame, beautiful model, work unsurpassed.

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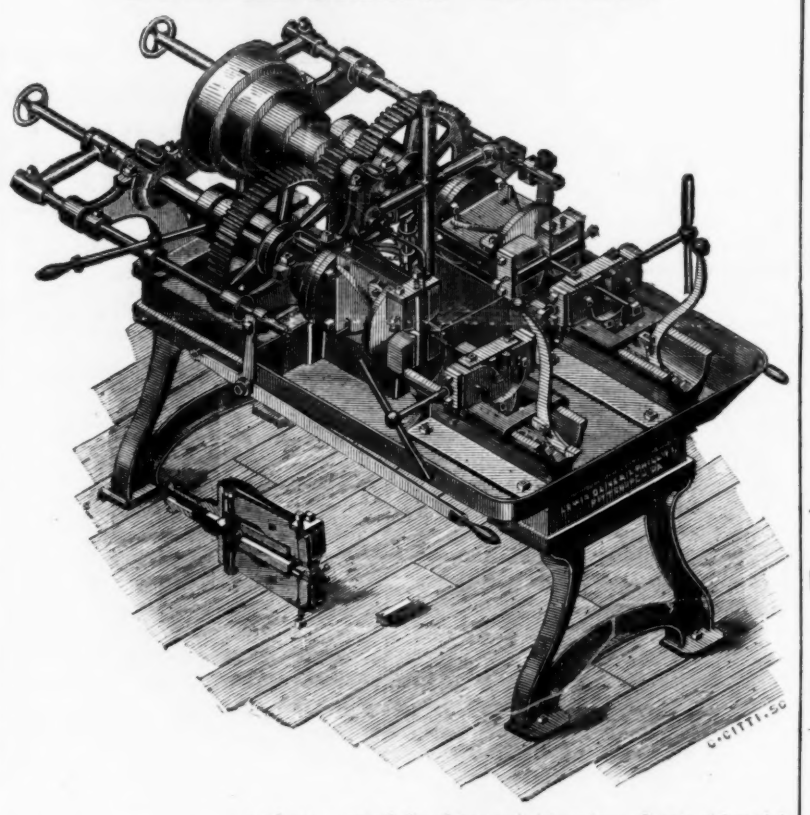
Lewis' Patent Bolt Machines.

DOUBLE SCREW CUTTER.



s at once, or cut a bolt and tap a nut at same time. It cuts either right or left from 2000 inch to 4500 ⅜ inch bolts in ten hours. The machine is self-oiling, and the dies are self-opening. Three sizes are made—the largest cutting from 2¾ in., the medium from 1⅝ in., and the smallest from ⅝ in. down.

Send for Photographs and Descriptive Circular of Bolt Header, Screw Cutter, Nut Tapper and Bolt Pointer to

LEWIS, OLIVER & PHILLIPS,

Merchant Bar, Bundle Iron and Heavy Hardware Manufacturers,

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H. B. NEWHALL, Agent, 11 Warren St., New York.

The Chapin Improved Bolt Header.

OFFICE OF

KENNEDY BROTHERS & CO.

PLAINVILLE, CONN., June, 1873.

To whom it may concern:

We have used for the last three years a Bolt Header manufactured by **The Chapin Machine Co.,** and believe them to be the **Best Bolt Header** in use. A man that is capable to run it can easily head 10,000 bolts per day, or 260,000 per month. We have headed on our machine in one hour and a quarter 3000 ¼ bolts. We cheerfully recommend the machine to any parties in want of such, as they are indispensable for heading bolts.

Yours, very truly, KENNEDY BROS. & CO.

The above is one of the many Testimonials we are receiving in favor of our Bolt Machinery. Circulars, Prices and all further information given by addressing

The Chapin Machine Co.,

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TURNED

MACHINE SCREWS,

One-sixteenth to five-eighths diameter. Heads and points to sample.

IRON, STEEL and BRASS.

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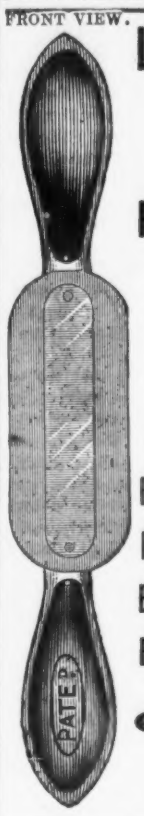

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HARDWARE HOUSE,

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Bonney's Pat. Hollow Augers & Spoke Trimmers.
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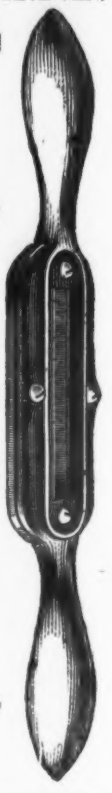

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The "EMPIRE," a Fan Blowing

PORTABLE FORGE,

(Patent Applied for.)

Without BELTS or BELLOWS.

It is more EASILY WORKED, gives a BETTER BLAST, and is the CHEAPEST Forge made, and

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Unfinished Picks.....$ 8·50 per doz
Finished Picks..... 10·00 per doz
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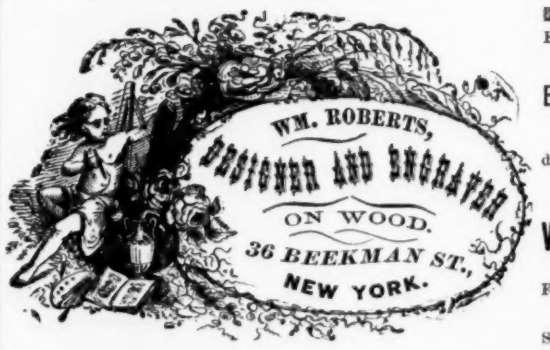

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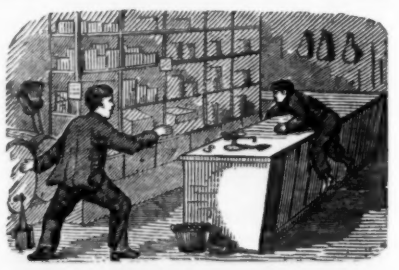

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(Double and Single Gate, ¼ in. to 36 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam.

Send for Circular.

Swedish Iron.

The following statistics of the Swedish iron trade will be found of interest:

The export of iron from Stockholm never was in any previous year of such an extent as in 1872. The production did not by far respond to the demand. The shipments of bar iron amounted to centners 741,607, against centners 572,908 in 1871. The stock of bars at Stockholm were, on the 31st of December last, only centners 135,746, against centners 269,314 at the corresponding period of 1871. The result of pig iron shipments is still more surprising, as it increased from centners 334,197, up to not less than centners 842,112, with a stock left of only centners 17,384.

The total quantity of metals shipped from Stockholm consisted of centners 1,873,458, whilst, in 1871, the entire export did not exceed centners 1,578,272.

The following comparative statement shows the repartition of the shipments of all kinds of metals to the different countries during the last five years, viz:

To	1868.	1869.	1870.	1871.	1872.
Amer. (U. S.)..	37,559	48,330	86,591	104,310	110,948
Brazil.....	11,574	22,676	10,111	8,936	7,452
Belgium.....	21,591	51,713	38,497	56,701	127,032
Denmark.....	115,237	64,707	81,117	87,874	86,912
England.....	339,593	329,025	344,876	401,753	784,942
East Indies....	68,116	48,683	2,854	3,608	....
France.....	248,794	275,976	174,199	97,498	151,394
N. Germany...	147,566	127,045	219,017	283,720	188,328
Holland.....	64,472	42,539	45,210	26,777	62,141
Italy.....	10,166	14,963	9,237	23,414	4,155
Portugal.....	75,277	87,186	109,348	106,899	89,533
Russia.....	136,990	171,384	334,022	371,796	255,961
Turkey.....	9,940	33,015	45,783	4,729	4,640
Sundry Coun..	1,536	3,729	4,771	255	....
Tot. Swe. cen..	1,292,411	1,320,926	1,499,583	1,578,272	1,873,458
Home cons'n..	104,348	108,753	80,949	90,033	84,644
Stock of Metals Dec. 31:					
Pig Iron.....	30,865	39,716	13,846	31,772	17,384
Other Metals..	475,820	384,140	404,395	316,718	189,800

The Rigby Manufacturing Company, of Toledo, O., has recently been incorporated, with a capital stock of $100,000, in shares of $100. The object is the manufacture of children's carriages, wagons and sleighs. They will make the "Rigby" patent carriage, and commence operations on a large scale.

Special Notices.

$10,000.--Rare Chance.

A person with the foregoing amount can learn of a rare opportunity to purchase three patented articles—hardware—the goods having a large sale, with a steady increase. Orders can be filled from New York city to great advantage. Satisfactory reasons for selling. Address, with real name,

D., Box 302, Harrisburg, Pa.

FREELAND TOOL WORKS,

(late A. M. Freeland), 538 & 560 West 34th Street, N. Y.

The undersigned, having succeeded to the business of the late A. M. Freeland, and having been in his employ for many years, are now prepared to receive orders for **First-class Engineers' & Machinists' Tools; Guide and Standard Screws,** cut to order; **Surface Plates** and **Straight Edges** of superior quality, on hand and made to order. **THOMAS & CO.**

To Iron Manufacturers.

Manufacturers or Capitalists who desire to engage in the manufacture of Iron Bridges and Roofs, and would join parties of experience, are requested to address **"IRON,"**

Office of *The Iron Age*, 10 Warren Street, N. Y.

Wanted,

By a man of experience and acquaintance, a position as salesman for a first-class Hardware Jobbing or Manufacturing House. Satisfactory references.

Address, with real name, *P. O. Box 467, Ogdensburg, N. Y.*

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INDUSTRIAL EXPOSITION,

OF CHICAGO,

will hold its First Exhibition during the coming fall. The building,

800 feet long and 200 feet wide,

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September 1st.

All Manufacturers, Artisans and Artists are cordially invited to avail themselves of this opportunity to place their Products before the people of the great Northwest. The duration of the Exhibition will not be less than four, and probably six weeks. Applications for space, with brief statement of character of intended exhibit, addressed to the undersigned, will meet with prompt attention and reply.

JOHN P. REYNOLDS, Secretary,

87 Washington St., Chicago, Ill.

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desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

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The undersigned, commercial Editor of *El Cronista* the Spanish Government paper in this city, and Foreign Editor and Translator of the *Daily Bulletin*, has made it a specialty for years past to translate industrial matter, with the strictest adherence to the technical wording, from and into English, German, Spanish and French, for manufacturers, patentees and others, and begs to be recommended to the iron masters and trade in that capacity.

C. KIRCHHOFF, Box 2806, Post Office.

Latest Publications translated by C. KIRCHHOFF. "German Imperial Consular Instructions." "Cuba may become Independent." Officially endorsed by the governments of Germany and Spain.

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By R. T. Hazell & Co.,

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Our REGULAR SALES of HARDWARE, CUTLERY, FANCY GOODS, &c., will be held on TUESDAYS and FRIDAYS throughout the season.

CASH ADVANCES made on CONSIGNMENTS without additional charge.

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Revised Discount Bolt List.

Book form, Philadelphia and Common, 20 discounts.

Revised Discount Screw List.

On card, 13 discounts.

Mailed, in perfect order, on receipt of price. Single copy, either list, $1·00; two or more, 75 cents each.

Address **FRANK DAYTON, 83 Duane St., N. Y.**

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A manufacturing firm of Staple Goods, having a Salesroom in the center of the Hardware Trade, on Chambers Street, wishes to arrange with other manufacturers for the sale of their goods.

Address "B," office of *The Iron Age*, 10 Warren Street, N. Y.

Office to Rent on Chambers Street.

A part of first loft in the most eligible block of the street.

For particulars address N., Office of *The Iron Age*, 10 Warren Street, N. Y.

OLD RAILS,

Flange and Double Headed.

Paul Strybos,

Antwerp, Belgium.

To Hardware Manufacturers.

A house dealing in Foreign Hardware, of nearly 40 years' standing, whose trade is with Hardware Jobbers throughout the United States, is desirous of securing the agencies of American Manufacturers of leading goods of large sale. To parties who want a Depot in New York, and a house to represent them with large and desirable connections, this is a good opportunity. Address *HARDWARE, Box 3962, New York P. O.*

STERLING

IRON & RAILWAY CO.

MAKERS OF

STERLING ANTHRACITE PIG IRON

FOR FORGE AND FOUNDRY USE.

A. W. HUMPHREYS, Treas,,

42, PINE ST., N. Y.

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addressed to reach the

HARDWARE

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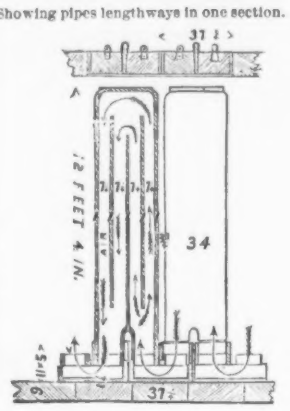
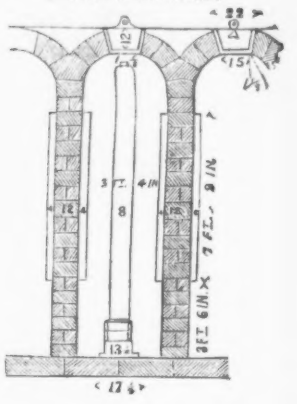


End view of one section.



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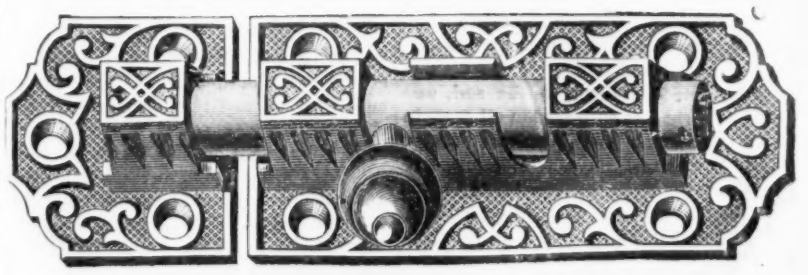

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The Iron Age.

New York, Thursday, June 26, 1873.

DAVID WILLIAMS . . . Publisher and Proprietor.
JAMES C. BAYLES . . . . Editor.
JOHN S. KING . . Business Manager.

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REMOVAL.

THE OFFICE OF

THE IRON AGE

Has been removed to

10 Warren St.,

NEW YORK.

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Material Independence.

The attainment of material independence has been the aim and object of all worthy and well directed national effort since the organization of society. This attained, those nations capable of reaching a certain degree of civilization have enjoyed, as the rule, the benefits of regular and sustained progress, which has enabled them to supply many of the wants of less civilized nations, while receiving from them, in exchange, means of enjoyment which could not be obtained within their own limits. On the other hand, nations of a nomadic disposition, and semi-barbarous, like the Mongol tribes of Central Asia, were wont to push out beyond their own proper territorial boundaries in search of fresh pastures, when the necessities of a roving pastoral life impelled them to take their herds to more congenial regions; but even they finally settled down and embraced agriculture and mining to become an industrious people in the end, like the Chinese, or took to the sea, like the Phœnicians, and founded distant colonies. A higher state of civilization and the amenities of a more polished life, the embellishment of the country they had raised to greatness, attached them to the soil, and this attachment was enhanced in all cases in which this country they inhabited proved, as nearly as could be, self-sustaining and self sufficient. Much, of course, depended upon the latitude they chanced to occupy, much upon the habits of luxury they indulged in, when attaining an elevated degree of civilization. Rome and the Byzantine Empire began to decline from the moment their people abandoned themselves to the enjoyment of enervating luxury, and began to look about them for the means of satisfying their effeminate cravings. So long as they strove to develop their highest capacity for self-sustenance, so long their existence as nations was assured, and whatever they achieved of real greatness was conceived and carried out during this period of concentrated nationality.

Happily for this nation, its territory is so located as to insure it the advantage of a climate favorable to the highest mental and physical development among the people, and to the prosecution of every industry essential to man's well being and happiness. In extent and variety of productions the country is very nearly self-sustaining already, and, if cut off from communication with the outside world, we have within our own boundaries the means of maintaining a true material independence. We might miss this thing or that for a time, but the unsatisfied desire would be the best stimulus to greater effort in providing substitutes for that of which we were deprived. There is, of course, no probability that such a misfortune as that of national isolation will ever overtake us, though wars may multiply and the world be in league against us, but the consciousness of our ability to maintain, if need be, an existence of absolute material independence, is a proud one for every American citizen, and true national greatness has its germ in this sentiment.

But great as has been our national progress in the development of our vast and varied resources, it has not been as rapid as it would have been if more of our young men had appreciated the opportunities open to them of reaping wealth and influence from the professions of mining engineering and metallurgy. In no part of the country does the number of scientifically educated mining engineers and metallurgists bear a just proportion to the importance and magnitude of this branch of industry, while commerce and the learned professions are already overcrowded. The reasons for this comparatively scanty representation of American talent in the mining profession are manifold. The principal one is the costliness of the study necessary, and its complicated, varied and comprehensive nature. Theory alone will not make a good mining engineer. He must, with all the knowledge he may have acquired, combine a practical experience and good administrative ability. He must not only understand how to apply science and use machinery, but to command men as well. Of all the more difficult professions thrown open to young men, scientific and practical mining is perhaps the one making the greatest claim upon real personal worth and force of character. Above all, the successful mining engineer must know how to inspire confidence and retain it. The profession recommends itself especially to the sons of iron masters and machinists, the majority of whom are well to do, and can provide for a long and expensive course of study. It ought to be open to all, and the day may not be distant when, from a national point of view, the profession may be deemed as worthy of government support as the military one. If but a small percentage of the young men looking forward to engaging in commercial pursuits would embrace the metallurgic profession, the country at large would soon reap untold riches from such well directed activity in the rising generation. There is not one of our States and Territories but has within its soil something worth developing, but while the harvest is plenty the laborers are few. To increase our supply of skillful miners, we must have a proportionate increase in the number of our skillful and scientifically educated mining engineers. To make a progress in metallurgic industry in its various branches as rapid as our opportunities warrant, we must have a greater number of scientific metallurgists to investigate, experiment, improve our machinery and simplify our processes. The time has passed for dependence upon men who know only the practice of their trades but are ignorant of its principles. The claims of science are asserting themselves on every side, and science and practice must henceforth march hand in hand in the van of the world's progress. Happily, our young men are no longer without the means of acquiring at home the broad and liberal culture needed to fit them for eminent usefulness in the various departments of mining and metallurgy, and we are glad to see that so many youths of talent and ambition are availing themselves of the facilities offered for the acquisition of scientific educations. But there is room in this great country for thousands of accomplished master miners, metallurgists, and analytical chemists, and the young man able to fit himself for these professions, who prefers to waste his energies in mercantile pursuits which do not promise success to one in one hundred of those engaged in them, must lack that true ambition which is the inspiration of all worthy and profitable endeavor for personal advancement, and the attainment of honorable prominence. The practical benevolence which has prompted our men of wealth to establish and endow technical schools and colleges throughout the country cannot be too highly commended. In them we are rearing a generation of miners and iron masters, whose labors will add many millions annually to the accumulated wealth of the nation, and, while laying the foundation for a rapid and permanent progress, contribute much toward rendering the nation not merely independent of others, but necessary to their existence. We do not believe that the people of this country have, as yet, begun to realize the vastness of the opportunity now offered them to place the United States first among the nations whose greatness rests upon the substantial foundation of a sustained industrial development, or how, through striving after material independence, we have gained a position from which we may contemplate the attainment of a still higher and more honorable ambition. When it is realized, our great productive industries will possess for our ambitious young men attractions far stronger than any held out by commerce. If we but produce to the limit of our capacity, our products will distribute themselves.

The British Coal and Iron Trades.

There are no important changes in the condition of the British coal and iron trades to note, and but little to encourage the hope of immediate improvement. From the testimony given before the Parliamentary committee, it is evident that coal cannot reasonably be expected to decline much, if any, as the miners would unanimously and successfully resist any attempt to reduce wages. The mine owners admit their inability to accumulate stocks, and the market must, so far as native coal is concerned, remain dependent upon the current output, which would be stopped if any attempt were made to reduce the miners' wages. The only chance of breaking up the strong combination among the miners lies in a material reduction in the coal consumption in iron manufacture—which, it is estimated, requires one-third the coal product of the country—and even then there is reason to believe that the miners would accommodate themselves to the changed condition, and proportionately reduce their output. In any case, the public are not likely to be benefited, as the mine owners have but little temptation to active competition in marketing their product, and will charge for coal all they can get for it, whatever the cost of working the mines.

As to pig iron, it may be noted that, in spite of apparently adverse influences, prices are firmly maintained, with an upward tendency. This shows very clearly that the rise in pig iron during the past two years has been brought about by the cause to which we attributed it, namely, the more rapid growth of consumption than of production. There is still a heavy foreign demand for British iron, notwithstanding the fact that a check is placed upon the natural increase of consumption by high prices, and had we a surplus for export we should have no difficulty in disposing of it, however large it might be. During the years 1871 and 1872 the stocks of pig iron in Scotland and Middlesborough were reduced 537,000 tons, although the production during this period increased 164,000 tons, showing an increased consumption of 703,000 tons of British pig iron during that period. At the present time there are no stocks of pig iron in Great Britain worth considering as affecting the course of the iron trade, and we have the best authority for believing that the production of British pig will show a considerable falling off in 1873, as compared with 1872. If this be true, an immense foreign demand must necessarily go begging. This is precisely what, two years ago, we said would happen sooner than our iron masters had any idea of, and while we are not surprised that our predictions were not generally credited at the time they were made, we shall be very much so if their realization does not lead to liberal investments of capital in iron manufacture, and a rapid annual increase in the iron product of the country. We cannot afford to neglect the opportunity now offering for building up an export trade in iron.

In British rolled iron the trade is now almost at a stand-still, high prices having reduced the consumptive and export demands to a minimum. In this branch of trade there is but little, if any, prospect of improvement in the immediate future. Under existing conditions prices cannot fall. The mill owners have, at present prices, so narrow a margin of profit that they would find suspension the only alternative in the event of a decline, unless resulting from a fall in the price of coal and in wages, neither of which are anticipated. Stocks of manufactured iron are completely exhausted and, from present appearances, we think it will be a long time before they are replenished.

Mr. Washington H. Donaldson, aeronaut, concludes a letter setting forth the practicability of a balloon voyage across the Atlantic as follows:

Professor Wise and myself have done all in our power to get aid from the different cities, but failed. Philadelphia being my birth-place, I gave her the first refusal, receiving plenty of encouragement, but no one to take stock in it. So we have come to the conclusion to earn the money by sensational ballooning, and construct the air ship ourselves, independent of cities, scientific institutions, or capitalists.

We are glad that Professor Wise and himself have reached so sensible a conclusion. If private individuals had seen fit to subscribe the capital asked for by the adventurous gentlemen, well and good; but to ask that Philadelphia or any other city should furnish the money out of its municipal treasury, was an impudence which we are glad to see has received the rebuke of peremptory refusal. It makes no practical difference to any one whether Professor Wise and Mr. Washington H. Donaldson can cross the Atlantic in a balloon, or whether they cannot, and to furnish them the money needed to make the attempt would be an obvious misappropriation of the public funds. If the gentlemen who propose the undertaking, which may be a safe enough one for all we know, have sufficient independence to earn the money to be expended in building a suitable balloon, they have our sympathies and best wishes; but as beggars, going about from one city to another, asking appropriations which municipal authorities have no possible right to make, they deserve the mortification of failure.

Mr. Carey on Industry and Labor.

As chairman of the Committee on Industrial Interests and Labor of the Constitutional Convention of Pennsylvania, Mr. Henry C. Carey, the veteran exponent of the truths of economic science, has presented an interesting report on the relations existing between labor and capital, which merits careful and thoughtful perusal. We regret that our limited space does not permit us to publish it in full, and that we must content ourselves with presenting a few of its strong points to the notice of our readers. As might be expected, Mr. Carey opposes the proposition to fix the number of hours constituting a legal day's work, and on the eight hour question argues as follows:

When the public law is asked to make eight hours a day's work with ten hours' wages, and when the demand has been complied with, nothing has been yet accomplished unless the wages of the ten hours shall have simultaneously been prescribed. In what manner, however, shall this be done? How shall the schedule of prices for the thousand different avocations be arranged? Shall the average rates of last year, or of the present one, be taken; and shall the wages of next year, or of others that are to follow, be kept up or held down to those figures? That this cannot be is clearly obvious. Equally so is it that something else, something very different from statute law, must determine the market price of labor. An act of Congress some time since limited the day's work of mechanics and laborers in the employment of the government to eight hours, and the President afterward ordered the pay which they had previously received for ten hours' work to be given them. With the reasons, or the results, of this act of government we are not here concerned. It is not a precedent for the general interference with private contracts now pressed upon us. In this case the government is one of the parties and the employes are the other, and as such they are free to fix the terms of the contract. Even were the case taken for an example, which it cannot be, still it is merely a legislative act having no claim to place in the Federal Constitution, or in that of a State. Open at any moment to amendment or repeal, it retains some of the required flexibility; but planted in the fundamental law it would lose all the necessary accommodation to changes of time and consequent changes of conditions.

This is a bit of common sense reasoning which we commend to the attention of our trade unions and eight-hour leagues. The questions Mr. Carey asks, in place of stating objections, cannot be answered; and, until they are, insuperable objections exist to any legislative interference with the freedom of contracts between employers and workmen. The tone of the report throughout manifests a warm sympathy for the cause of labor, and an intimate knowledge of the difficulties experienced and burdens borne by the workingmen under the wages system, but he knows that one evil is never remedied by another, and that class legislation, whichever way it pointed, would result in untold mischief. Mr. Carey thus summarizes the result of free trade, and of the reckless commercial competition which it encourages:

The system of international trade which has for several generations held sway among the civilized peoples of the world is marked by results, as regards the labor interest at large, which condemn it as a system of industrial tyranny on one hand and dependence on the other, mischievous alike to the oppressor and to his victims. The trading and manufacturing policy of the monopolistic nations is for themselves a system of pauperism, famine, despair, and emigration; their own laborers and those of the victim nations being thus everywhere forced into revolt against that capital to which, under other circumstances, they would look as to their chiefest friend. Tested by its fruits, what has this monopolistic system done for the welfare of the masses of the peoples compelled to its support and maintenance? Let the history of the past, during which it has had full sway in Western Europe, answer! The toilers have fled in multitudes from their native lands. Nearly the whole population of Australia, and fully one-seventh of the people of the United States, are foreigners by birth. The commercial and industrial regime of those parts of Western Europe which have waged war upon foreign laborers by means of oppression of their own, is thus shown to be one of expatriation for those of their poor who have been able to escape therefrom; hundreds of thousands, meantime, being thrown upon the public charity, while tens of thousands of its victims have perished of want, and of the diseases which follow in the wake of insufficient supplies of food. That laborers have much to complain of in reference to their condition in the Old World is very certain. Whence, however, come effects so fearful as these—so damaging to its boasted civilization—so reproachful to its Christianity? The explanation is this: To absorb the industrial functions of all other nations, especially in their highest forms of production, they have been obliged to undo work the labor of countries whose markets they have invaded. Wages to their own workmen lower than the lowest of the home wages of foreign labor so employed constitute the one terrible condition of success. Pauperism, starvation, banishment, are thus the necessary fruits of that ruthless policy which so long has employed the native laborer in a struggle with that foreign one whose real interests are to utilize in harmony with his own the opportunities and the means of self-supporting employment. Such is the reflex mischief that falls naturally upon the culprit community that assumes to make itself the workshop and the centralized commercial emporium of the world. The blood sucked from the rest of the body, while it gorges, paralyzes the congested organ.

Of immigration Mr. Carey says, incidentally:

As a consequence of the great increase in the power of combination that has thus been brought about, we find the manufacturing product of the country to have grown in the period 1860 to 1872, from $1,800,000,000 to $5,000,000,000, the mere increase having been almost twice the total amount to which the country had attained in the centuries that had preceded the war of the Rebellion. Adding to these figures the foreign manufactures consumed, we obtain for the first—a free trade period when immigration was rapidly passing away—a total consumption of about $65 per head; whereas, in the period which since has passed, and in which immigration has so greatly grown, it has risen to more than $130 per head. So far, therefore, is the workingman from having occasion to dread the competition of the immigrant, that he needs, night and morning, to pray for maintenance of that policy which is now making demand on Europe for so much of its half fed and half clothed population, thereby compelling both landed and manufacturing capitalists to the adoption of measures tending so to improve the condition of those who are left behind as to induce them to forego the idea of abandoning their native land. Never in the world's history has there been furnished such conclusive evidence of the fact, that measures tending to benefit the workingman anywhere, tend toward raising his condition everywhere, and that, therefore, there is a perfect harmony in the real and permanent interests of mankind at large.

Mr. Carey concludes his report by urging the abolition of all unnecessary restrictions upon the formation of corporate bodies, and the adoption of a system similar to that which has been attended with such important benefits in New England, New York and Ohio. The laws of Pennsylvania relative to the formation of stock companies are so confused and uncertain that nearly every new company organized is obliged to obtain its special charter from the Legislature with the aid of corrupt lobby influence, which is also employed to defeat schemes that, if unrestrained, might result in establishing a formidable competition with established companies. By his regular attendance at the meetings of the Convention, and his active participation in its deliberations, Mr. Carey is doing much to shape the action of that body, and his influence for good will be felt in many ways as long as the work of the Convention shall remain upon the statute books of the State.

Convention of Stove Manufacturers at Niagara.

On another page will be found an interesting account of the convention of the National Association of Stove Manufacturers, held at the Cataract House, Niagara Falls, on the 18th and 19th instants. The most important action of the convention was the adoption of a resolution declaring that the prices adopted at the Pittsburgh convention, in February last, be continued without change to the end of the current year. As these prices are not embodied in the resolution, we give them here, for the information of such of our readers as may be interested in knowing to what schedule the convention pledges its adherence. The prices adopted at Pittsburgh are as follows:

Minimum price for common stoves	7¼	cents	₱ lb
" " medium class	8	"	"
" " first class	9	"	"
" " odd plates	9	"	"

Terms of credit not to exceed four months, with 5 per cent. discount for cash if paid within 30 days.

We cannot but commend the wisdom of the National Association in assuming this position. The prices above given were adopted on the basis of $45 per ton for foundry iron, and there has been no decline in pig metal sufficient to justify the stove manufacturers lowering prices, especially as consumers had the advantage when iron ranged between $50 and $55 per ton. There is, we think, good reason to believe that the iron market will soon recover from its present depression, and that, while it would not be safe to fix its average price for the next half year, prices of stoves and hollow ware could not be adjusted upon a safer basis than that of $45 per ton for foundry pig. Dealers in many sections of the country have been waiting for some weeks to know what the action of the National Association would be with regard to prices, and it was the unanimous opinion of the delegates to the convention that any reductions at this time would be regarded as an evidence of weakness in the trade, engendering a suspicion that the bottom had not been reached and that still better terms could be had later in the season. The action of the convention will set at rest any doubts on this subject, and manufacturers look forward with confidence to a marked improvement in business as the season advances. There was some dispute as to the propriety of the course adopted by some founders in selling particular kinds of odd plates below the scale, but the general opinion seemed to be that discussion upon such a point was frivolous, and that, when circumstances rendered it necessary or desirable that extra heavy odd plates should be sold for less than 9 cents, founders should be permitted to do so without being regarded as violating their pledge as members of the National Association.

The convention was very pleasant and harmonious, and the natural attractions of the place of meeting added much to the enjoyment of the members and guests. Many delegates brought their families, and the occasion was one to be long remembered. We take this opportunity of acknowledging our obligations for the courtesies extended by the officers and members of the Association to our representative at the convention.

The Millerstown Iron Company, of Reading, Pa., have commenced the erection of their blast furnace, which is to be in blast in one year.

NATIONAL ASSOCIATION OF STOVE MANUFACTURERS.

Semi-Annual Convention, at Niagara Falls.

NIAGARA FALLS, June 19, 1873.

The National Association of Stove Manufacturers assembled in convention at 12 m., on Wednesday, June 18, at the Cataract House. This association was organized in New York, in March, 1872, and has had two conventions since then and previous to this one, at Cincinnati and Pittsburgh respectively. The following are the

OFFICERS FOR 1873:

President—John S. Perry, Albany, N. Y.

First Vice-President—Giles F. Filley, St. Louis, Mo.

Second Vice-President—Wm. H. Tefft, Detroit, Mich.

Treasurer—A. Bradley, Pittsburgh, Pa.

Board of Managers—Joseph W. Fuller, Troy, N. Y.; Sherman S. Jewett, Buffalo; William Resor, Cincinnati, O.; John Truslow, N. Y.; Miles Pratt, Boston, Mass.

The following stove manufacturers were present at the opening of the convention:

Wm. Galway, Galway, Semple & Co., Cincinnati, O.
J. H. Dodding, Dighton Furnace Co., Taunton, Mass.
R. P. Myres, Myres, Rouse & Co., Cleveland, O.
Charles H. Buck, Buck & Wright, St. Louis, Mo.
J. F. Rathbone, Rathbone, Sard & Co., Albany, N. Y.
R. P. Waterbury, Cleveland Stove Co., Cleveland, O.
E. S. Barber, Detroit Stove Co., Detroit, Mich.
W. Sandford, National Stove Works, New York.
W. H. Crowl, Central Stove Works, Cleveland, O.
H. Perkins, Taplin, Rice & Co., Akron, O.
N. Breyer, Co-operative Foundry, Rochester, N. Y.
D. G. Littlefield, Littlefield Stove Co., Albany, N. Y.
W. M. Spackman, American Stove Co., Phila.
Charles Eddy, Eddy, Coates & Co., Troy, N. Y.
Thomas White, Quiney Stove Foundry, Quincy, Ill.
Henry Hugus, Graff, Hugus & Co., Pittsburgh, Pa.
Geo. H. Phillips, G. H. Phillips & Co., Troy, N. Y.
E. E. Sill, Sill Stove Co., Rochester, N. Y.
C. Olhaber, Mears, Olhaber & Co., Cincinnati, O.
W. T. Black, Johnson, Black & Co., Erie, Pa.
G. M. Woodward, Taunton I. W. Co., Taunton, Mass.
S. H. Ransom, S. H. Ransom & Co., Albany, N. Y.
Wm. H. Whitehead, Tibbals, Shirk & W., Erie, Pa.
N. B. Perry, Perry & Co., Albany, N. Y.
A. E. Chamberlain, Chamberlain & Co., Cincinnati, O.
John B. Herron, J. B. Herron & Co., Pittsburgh, Pa.
S. W. Perry, Sweet, Quinby & Perry, Troy, N. Y.
R. R. Finch, Union Stove Works, Peekskill, N. Y.
Jos. Bell, Jos. Bell & Co., Wheeling, W. Va.
C. H. Senseney, Jos. Bell & Co., Wheeling, W. Va.
J. J. Warren, Stamford Foundry Co., Stamford, Conn.
John S. Perry, Perry & Co., Albany, N. Y.
A. J. Redway, Redway & Burton, Cincinnati, O.
S. R. Burton, Redway & Burton, Cincinnati, O.
G. Sard, Jr., Rathbone, Sard & Co., Chicago, Ill.
Thomas Jones, Foxell & Jones, Troy, N. Y.
George Garry, with Foxell & Jones, Troy, N. Y.
I. J. Baxter, American Stove Works, Peekskill, N. Y.
Henry S. Hubbell, Hubbell Bros., Buffalo, N. Y.
Alfred S. Hubbell, Hubbell Bros., Buffalo, N. Y.
S. S. Jewett, Jewett & Root, Buffalo, N. Y.
F. H. Root, Jewett & Root, Buffalo, N. Y.
A. Bradley, A. Bradley & Co., Pittsburgh, Pa.
G. F. Filley, Excelsior Mfg. Co., St. Louis, Mo.
T. S. Mitchell, Mitchell, Stevenson & Co., Pittsburgh, Pa.
John Abendroth, Abendroth Bros., New York.
E. Bussey, Bussey & Co., Troy, N. Y.
C. A. McLoed, Bussey & Co., Troy, N. Y.
Rufus Lape, Bussey & Co., Troy, N. Y.

Among the invited guests of the association present at the convention were Messrs. W. W. Pasco, Jas. C. Bayles, Alex. Selkirk, and representatives of the Buffalo press.

The Convention was called to order by Mr. John S. Perry, President, and Mr. Grange Sard, jr., of Albany, was chosen Secretary. The President then read an address of much statistical interest.

THE PRESIDENT'S ADDRESS.

Mr. Perry began his remarks, which we have not space to publish in full, by reminding his hearers that, by a curious coincidence, the first stove convention ever held in America assembled at Niagara Falls one hundred and ten years ago, almost to a day. The convention alluded to was the council between Sir William Johnson and Major Gladwin, "Old Belt" and his braves, and certain others, relative to the procuring of a new supply of stoves for the use of the garrison, which resulted in the commissioning of "Old Belt" to bring them in canoes from Oswego. The present council was held under different and more favorable auspices. This was the fourth meeting of the National Association, now in the second year of its existence, and it was fitting to inquire what had already been accomplished, and what yet remained to be done. He thought it might be truly said that no association, having such diverse sectional interests, had ever passed the trying time of organization with more dignity and honor. Difficulties had, of course, been encountered, but they had survived the spring and early summer, so trying to the stove trade, without taking counsel of their fears, and now the dull and quiet months had come round, with their attendant misfortunes for unwise and improvident manufacturers; but they had maintained faith with the principles of the Association, and shown a manly confidence in the future. They had also seen the trade elevated in public regard, and had derived material benefits from the wise and conservative policy which, as an association, they had adopted. Co-operation had become a commercial necessity in all countries, and they had tested and proved its benefits. More frequent papers on practical subjects would add to the interest of the meetings, and the following suggested themselves as appropriate subjects for consideration: the economical production of iron; economy in fuel consumption; systematic foundry management; credits; beauty in its relation to form and proportion, and other kindred topics. In this branch of industry, at least, America ought permanently to lead the world. The American stove manufacturers had no foreign competition, and that certainly was a great thing in their favor.

Mr. Perry then called attention to the condition of the iron and coal markets of Great Britain, and stated his belief that the day was not far distant when the importation of this valuable metal would cease. As affording a basis from which to estimate the future of American iron, Mr. Perry called attention to our great resources of ores and coal, the vast annual accessions to our laboring population through immigration, the annual increase in national wealth, and the steady growth of the demand for all kinds of iron work. But one thing, he thought, was needed to render America independent of the world, and that was the greater diversification of industry, toward which we are making rapid progress. Alluding especially to the stove manufacturing interest, Mr. Perry admitted that the past year had not realized expectations in all respects, but he saw no occasion for present alarm or apprehension for the future. "Those who are inclined," he said, "to look upon the dark side of things, may ask me for that view of the picture. I am unable to present it. I don't know where it is to be found, except in the imagination of those who seem to enjoy despondency. * * * That individual disasters in business will occur, unpropitious seasons intervene, and men of weak faith at times be discouraged, no one can doubt. These exceptional cases will ever exist, but they do not affect the broad principle. Gentlemen, you may rest with unmoving confidence in the belief that the march of mechanical industry in this country is to be onward, and at a speed never before realized; and that we, as stove manufacturers, may be squarely in the line and prepared to gather the profits of success, it becomes us to be awake and active and, at the same time, patient and cautious."

In conclusion Mr. Perry examined carefully, and in close detail, the condition of the iron market, and counselled the association against any action calculated to convey to the trade the impression that prices were weak or their tendency downward. Any reduction in the prices of stoves would, he thought, be a suicidal policy, and he urged upon the convention the importance of maintaining a firm front in the certainty of enjoying a good business when the summer dullness was past.

At the conclusion of the president's address the following address of welcome was delivered by Sherman S. Jewett, Esq., of Buffalo:

ADDRESS OF WELCOME.

It does not seem inappropriate that Buffalo should welcome you to the convention, though 20 miles away. That beautiful city is at the head of this magnificent strait, and has derived a large portion of her strength and prosperity from those inland seas which pour their flood down the great cataract of the Niagara. She is the daughter of Erie and Niagara, and a proud and living daughter too. And yet it seems strange that we are gathered here within the sound of Niagara's ceaseless voice of majesty to discuss the laws of trade and the interests of a manufacturer's guild. But (will it seem a little vainglorious to say so?) Americans are many sided. Nature and majesty in the morning and evening, stoves and business between, are not too much, I think, for the appreciation and earnest study of the intelligent gentlemen whom I see before me: so I think, on the whole, that it was a happy thought to hold our semi-annual meeting at Niagara.

Gentlemen, this is classic ground. Scarcely any other locality in our country, as you well know, possesses so much of historic interest as well as native grandeur and beauty, and I do not doubt that your sojourn here at this time will be among the most delightful memories of your lives. The world is beautiful to-day, and if we were made of cast iron we could hardly resist the power of that beauty which seeks our souls through every avenue of sense.

In the presence of nature you cannot but remember that you are at Niagara, but during the hours of business I hope you will try and think yourselves at Buffalo. What Buffalo may do to make this convention a success she will do gladly. She is not altogether unknown to you. The only tight air about her is her "tight air stove," and the winds which visit her now and then have, I hope, carried through the land some not entirely discreditable stories of her enterprise and well doing. Of course you will come and see us. You shall not find her head crowned with as many smoky plumes as Pittsburgh, but she is far from not having some adornments of that kind. Come and see us. In these June days we will not boil you nor roast you, though we should be very glad to toast you.

Buffalo, so far as she can speak through my feeble voice, welcomes you to the banks of the Niagara.

PROCEEDINGS.

At the conclusions of the address of welcome Gen. J. F. Rathbone addressed the convention. He had not supposed, he said, that the question of prices for the remainder of the year, was to be agitated at the meeting. He thought all present would agree with him that the price of stoves fixed at the Pittsburgh convention in February last was predicated upon iron at $45, per ton, and that whatever slight decline in its value might have taken place, it had not yet reached that figure. He agreed perfectly with the views expressed by the President, and thought it would be unwise and dangerous in the extreme to entertain the idea of a reduction in stoves. He believed that a reduction of one farthing would ruin business for the ensuing year.

Mr. Chamberlain moved that the address of the president and of Mr. S. S. Jewett be entered upon the minutes. Carried.

Mr. Chamberlain further moved that the prices adopted at the Pittsburgh convention be reaffirmed. The motion was carried unanimously, but the vote was subsequently reconsidered, in order that a stronger and more decided expression might be given to the opinion of the convention on this important subject. An animated debate followed, in which nearly all the members present took part. The question of the price to be charged for odd plates was raised by Mr. Eddy, of Troy, who noted the fact that, in the sale of these articles, deviations from the Pittsburgh scale had been made by certain firms. This gave rise to an animated discussion which, however, only lead to the conclusion that debate upon such a question was frivolous and that deviations from the scale in the case of certain forms of odd plates, when such deviations were considered necessary, should be allowed without giving rise to any misunderstandings. The debate finally resulted in the passage of a motion for the appointment, by the chair, of a committee of five to draft resolutions declaring the sense of the convention on the subject of prices. The meeting then adjourned, to meet on the following day at 10 o'clock a. m.

SECOND DAY'S PROCEEDINGS.

The convention was called to order on Thursday, at 10:30 a. m., by the chairman, and a roll call showed the same members present as on the preceding day, with the addition of Mr. L. D. Vose, of Ducher, Vose & Adams, Milwaukee.

Mr. A. E. Chamberlain, of Cincinnati, chairman of the committee appointed on Wednesday to draft resolutions, presented the following:

Whereas, Since the last meeting of this association there has been no essential change in the price of the higher grades of strong fluid iron used in the manufacture of stove plate and hollow ware, and in view of the continued high price of all materials entering into the production of the same, and believing that these prices will be fully sustained during the remainder of the year, therefore

Resolved, That this association recommend to all engaged in the manufacture and sale of stoves and hollow ware a firm adherence to prices and terms named in Pittsburgh until our meeting in February, 1874.

A. E. CHAMBERLAIN,
G. F. FILLEY,
S. S. JEWETT,
A. BRADLEY,
S. H. RANSOM.

Mr. Thomas S. Mitchell, of Pittsburgh, moved that the report be received and that the ayes and noes be called.

Mr. Root, of Buffalo, moved as an amendment that the report be adopted by a rising vote. The amendment was carried, and the report of the committee was accordingly adopted unanimously.

Mr. Hugus, of Pittsburgh, inquired whether after the adoption of the report by the association the members could return home, and in their local associations vary the prices.

The president answered in the negative.

Mr. Rathbone, of Albany, said that he thought the vote was a pledge, on the part of the members present, that the action taken was to be sustained. If not, the meeting was a failure. The association was at first, and very wisely, he thought, opposed to making any pledges, but the results so far had been that the recommendation had been sustained, and the association had been a source of prosperity, for the stove manufacturers had made a fair living profit, which they could not have done without this aid.

Mr. Rathbone said that he knew some of the founders were troubled because iron had fallen a little, and the orders were small. Perhaps a pledge was needed in order that they might be supplied with a little back-bone, and if any one wanted a pledge adopted he for one was willing to pledge his firm to stand by any action of the convention. He hoped there would be no wavering, no concessions; the old adage, in union there is strength, would prove to be of more value this year than ever. If the members wavered they were lost. He therefore hoped there would be no flinching and no turning backward.

Mr. Charles Eddy, of Troy, asked whether some of the members did not understand that the local associations could vary prices. He never thought so, but considered the action of the convention binding. If other members thought differently, he hoped their views would be made known at once.

Mr. Galway, Cincinnati, thought the action of the convention tantamount to a pledge.

Mr. Chamberlain, of Cincinnati, said that the word recommendation was used first when the association was weak in numbers and the members distrustful of each other. Now it was a strong body, and with its off-shoots, the local associations, would bind everybody.

Mr. Clement Olhaber, of Cincinnati, in behalf of the local association of which he is vice-president, pledged his association to stand by the convention.

Mr. Myers, of Cleveland, thought that there would be no trouble with the local associations about prices, as they were generally organized for special purpose.

Mr. Mitchell, of Pittsburgh, said that if the convention was to resolve itself into a law-making body, it had better provide some penalty for the infraction of its laws.

Mr. Whitehead, of Chicago, said he lived in a locality where he met any number of stove men, and his opportunities for forming opinions regarding the trade were good. He had no fear for the future if the pledges and recommendations were carried out as in the past.

Mr. Chamberlain, Cincinnati, asked the president if the local associations did not always endorse the general association? The president replied in the affirmative, and Mr. C. thought that if that was the case, all the ends desired had been accomplished. A great deal of desultory talk followed about the price of old stove-plates, in which a dozen or twenty of the members engaged. It was brought to a close by Mr. Jewett, of Buffalo, who thought that the members had talked enough about a trivial matter, the convention endorsing his views.

Mr. Olhaber, Cincinnati, moved that the guarantee on stove plates from fire cracking be abolished.

The president thought the subject could not be settled by resolution.

Mr. Olhaber said that the adoption of the resolution would save a great deal of money.

On motion of Mr. Jewett, Buffalo, the resolution was referred to the next meeting.

The treasurer, Mr. A. Bradley, of Pittsburgh, reported the amount in the treasury to be $283·12.

On motion of Mr. Jewett, the president was authorized to levy any assessment upon the members that in his judgement might be deemed necessary, to provide for running expenses.

Mr. Filley, St. Louis, made a few remarks in relation to the difference in the cost of the manufacture of plate, claiming that it cost less in proportion to manufacture a heavy plate stove than it did one of light plates.

On motion of Mr. Myers, Cleveland, Mr. Filley was requested to prepare a paper for the next Convention.

Mr. Root, Buffalo, asked if the subject matter of the February meeting had been canvassed.

Mr. Rathbone, in behalf of the members of the trade in Albany, invited the Convention to hold its next session there.

Mr. Filley invited the Convention to hold its session in St. Louis, either in February or June.

On motion of Mr. Hughes, the invitation of Mr. Rathbone was accepted.

Mr. Olhaber, Cincinnati, offered the following:

Resolved, That the thanks of the National Stove Manufacturers Association are hereby tendered to the stove manufacturers of Buffalo for the many kind attentions and courtesies extended to us during our visit at Niagara Falls.

Resolved, That the attention and liberality of the proprietors of the Cataract House are deserving the warmest commendation, and will always be remembered by us.

Resolved, That in returning our thanks to the Press for their presence and assistance, we are not merely adopting a customary resolution usually offered at the close of a convention, but one that we feel is well deserved, and is hereby heartily tendered.

The resolutions were unanimously adopted.

At the request of the President, Mr. Benn Pitman, the stenographer of the Convention, read a paper on art, as applied to stove decoration. The following is the

ADDRESS OF MR. PITMAN.

The remarks I may make were suggested by a conversation which I had last evening with a cultivated lady, the wife of your esteemed President, on the subject of art, as applied to the decoration of stoves.

I would not presume to occupy a moment of your time in discussing the theory or practice of stove-making, because I know nothing save what I have learned from you; but as you cannot, or will not, make a stove without ornamenting its details to a greater or less degree, by which you are brought within the domains of art, and as I have paid some attention to the principles which underlie legitimate ornamentation, I may, without presumption, offer a hint upon the subject. The general love of ornamentation has made it necessary to decorate a thing of such intrinsic utility as a cooking stove; but I think I am not unjust in saying that I could not instance any article of manufacture in which I have seen more glaring art anomalies than in the decoration of stoves. The measure of art culture possessed by any stove manufacturer can be as accurately determined by the quality of its ornamentation as can be that of any nation or people. Egypt, Hindostan, Greece, Persia, the Mound-Builders of this country and mediæval Europe, had each its characteristic ornamentation; and the measure of their moral and artistic culture is exactly shown in the quality of their ornamentation. Our modern work shows our intelligence and culture in certain directions, as, for instance, in stoves, in evincing great familiarity with the principles of science and respect for utility and economy; but instead of having our own appropriate ornamentation growing out of the thing we construct, we take a meaningless conglomeration of scraps from every nation and people who has preceded us. The faults of our stove decorators may be said to be: First, excess of ornamentation; and, second, the employment of doubtful, inappropriate, or positively vicious ornamentation.

The material of which stoves are constructed, whose prominent qualities are strength and endurance, demands a treatment at once severe and simple. The utility of the article is belied when covered with excess of ornamentation. A lady's fan may have every portion of its ivory and silk carved, perforated, painted or gilded, but a gentleman's walking stick must have its ornamentation confined to the handle. When it is not so, the stick will usually be found in hands of a rustic or an Indian. The excess of ornamentation seen on some stoves corresponds to the tattooing on the face of an Indian, or to the elaborate carving sometimes found on the handle of his canoe paddle. Such ornamentation is at once inappropriate, useless and barbarous. It is safe to apply to decoration the rule you systematically apply to other acts of your business life, namely, not to do a thing without a sufficient reason. Of course, the degree of elaboration that would be permissible on a parlor stove would be inappropriate and, therefore, inadmissable on a cooking stove. Among "doubtful" ornamentation I would place all the nondescript, meaningless forms, ornamentation suggested by, but which are abortions of, Greek and Gothic forms. Among ornamentation which must be classified as "doubtful" I should include the use of monograms as the principal decorative feature of panels.

The ornamentations which I should regard as "bad" and "vicious" in the decoration of stoves would include all human, animal, and even floral forms. The right principle of construction having been determined upon, and due consideration given to economy of space and material, the external form of an article of utility, such as a stove, should strictly follow the external construction. The ornamentation should be simple and appropriate. Elements of decoration admissible on articles of wood and on structures of stone, are inadmissible on iron. I cannot see that the ornamentations of a stove can legitimately go outside of paneling, raised and sunk, moldings, arabesque forms such as eye crystals, geometrical patterns, and bosses imitating, with more or less ornamentation, the heads of nails and rivets.

It is not to be supposed that a stove whose design and ornamentation show unexceptional good taste will to-day sell more readily to the average buyer than one showing every evidence of the worst taste. The public eye and the public taste are yet uninstructed. But if I were a stove maker I would vastly more enjoy and value the commendation of a dozen men who understood the matter than the approval of a thousand whose commendations indicated only their ignorance.

The thanks of the convention were voted to Mr. Pitman, for his interesting paper, which was directed to be placed upon the minutes.

Mr. James C. Bayles was then invited by the chair to address the convention, and responded as follows:

ADDRESS OF MR. BAYLES.

Mr. President, Ladies and Gentlemen:—Coming here as a guest I had not expected to speak, and although I must confess to having received brief warning of this compliment, I respond to the invitation of the chair with reluctance, feeling that I can say but little, without more preparation, that will interest or instruct you. I feel the natural diffidence of youth in addressing my seniors in years and experience, but it would be ungracious in me to withdraw from this meeting without acknowledging for myself and those who represent the same profession, the courtesies extended to the members of the press here present. I trust I shall not be accused of professional egotism if I say that, in my opinion, the rapidity of our industrial progress depends in some degree, at least, upon the intelligence and honesty with which the newspaper press of the country shall lend its aid to the task of inspiring the public mind with a sense of the magnitude of the opportunities which, as a nation, we see opening before us; of stimulating enterprise and establishing public confidence. I believe that the journals which seek to represent the various branches of iron manufacture are honestly and intelligently conducted, by men who seek less personal gain and advancement than the best interests of their great constituencies: and, as a working journalist in this field of newspaper enterprise, I ask you to look with favor upon our efforts and to lend us the helping hand. Newspaper men are a misunderstood community. The public look to them as they look to the encyclopædias, for exact and fresh information upon everything which they want to know about. That is right and proper, but they forget that a newspaper which is a distributing reservoir must also be a receiving reservoir, and that one head, however full, cannot supply the stream of knowledge which is forever flowing out through the columns of a well conducted trade journal. Now, gentlemen, these may seem like very general and commonplace remarks, but they have a point, and the point is just here: if you want a literature pertaining to the theory and practice of your business, you must yourselves contribute to it liberally. The editor is not omniscient: he is a very ordinary mortal, hard worked and too often lacking encouragement, and your business patronage, however generous, will aid him to a living, perhaps, but not to the attainment of his higher and more worthy ambition. He looks to you not for charity, but for co-operation in his important labor for the public good, and asks not that you shall merely pension him with subscriptions and advertising, however welcome and necessary these may be, but that your knowledge and your experience shall ever help to fill the bottomless reservoir and swell the outgoing stream. A fact, a suggestion, a timely hint, or, better still, a contribution calculated to excite interesting and profitable discussion, will often be of more value to the newspaper editor than your most liberal business patronage, and better enable him to render you in turn efficient and valuable service. If the trade newspapers of the United States are ever to attain the power and influence for good which those of Great Britain have attained; if those which represent your own business, and to which you look for information, are ever to render you the full measure of useful service which you have a right to expect of them, you must make them the medium for the exchange and comparison of your own ideas, observations and experiences. Pardon me, gentlemen, for the liberty I take in thus addressing you, but it is only natural to speak first of that which is uppermost in our thoughts, and I trust you will believe that I speak less from selfish motives than because I am prompted by professional zeal to remind you that you owe a duty to the press which you must discharge, if you would have the press worthily and ably represent your enterprise and progress, as capitalists controlling one of the great productive industries of the country.

If I have not already reached the limit of your patience, I will, at the suggestion of your honored President, venture a few general remarks upon what seem to me the outlook for the iron trade of America, and for those branches of manufacture most intimately connected with it. After the interesting and instructive paper read yesterday by the chair, I need not bring to your notice any of the startling statistics which show the rapidity of our national progress or the growth of our manufacturing industries. But, gentlemen, even with these statistics before us, I think we will find it difficult to realize that the marvelous changes which have taken place within the past few years—changes imperceptible until very recently—have reduced those vague and indefinite prophecies of the ultimate supremacy of America as a producer of iron, with which we have so long been familiar, to a certainty of the immediate future. Once we were satisfied to think that America *might* one day become the rival of England as a producer and manufacturer of iron. Now we know that it *must* be so, and that Columbia is already fitting to her fair brow the iron crown which has been the symbol of England's commercial royalty for so many centuries. The difficulties which have overtaken the iron manufacturing industries of Great Britain are not mere temporary disturbances, to be soon set at rest and successfully guarded against in future. England has not only reached the limit of her extreme industrial development, but, so far, at least, as iron is concerned, she is receding therefrom, and her production of pig in 1873 will, I learn upon eminent authority, be less than in 1872. Her greatest iron masters admit that, while her coal is not exhausted, her mines are under such control that she will never again have the advantage of cheap fuel; her native ores, though abundant in some localities, are inferior, and in such limited supply at the surface that she must look to Spain, and even to this country, for fresh supplies to supplement her own failing production; her labor market, drawn heavily upon to supply the annual emigration to America, is hopelessly disorganized, with no probability of a return to cheap wages. Her great capitalists are not only coming here and buying liberally of our undeveloped mineral lands, but are organizing companies at home to build furnaces and rolling mills here—schemes of which men eminent in the British iron trades are chairmen and directors. What does this mean? Merely this: the iron master of Great Britain have seen our advantage before we ourselves appreciate it, and are placing capital here which can no longer find profitable investment at home. This is our great rival, "the workshop of the world," the mighty ruler of the seas, builder of ships, and producer of cheap commodities! And what does this change, so sudden as to be almost incredible, imply? England has been the exporter of iron and its manufactures to every country of the civilized world. Her control of this trade has been absolute and her monopoly so complete that competition, even in the remote future, seemed almost beyond the range of possibility. How is it with the countries to which she has sent her iron and manufactures of iron? Without one exception they have caught the inspiration of progress, and are building up a higher and more regularly developed civilization upon an iron foundation. Their consumption of iron has enormously increased, and is still increasing, though temporarily checked by the high prices of the past two years. Iron is the prime element of a modern civilization, and they must have it in greater abundance than ever before. Those that have within themselves the necessary resources are rapidly expanding their iron industries; those that have not must continue to look abroad for supplies, and if they still find them to best advantage in the English market, it is only because we have not yet increased our production to an extent sufficient to leave us a surplus for export. Gentlemen, I believe, and, did time permit, I should be glad to tell you many interesting facts which confirm that opinion, that within ten years—perhaps I may safely say five, but certainly within ten years—we shall cease to look upon England as a rival in iron manufacture, and that before that time she will find profitable use for many thousand tons of American iron annually.

Perhaps it will be said that there is nothing in the present condition of the American iron trade to warrant this sanguine prediction. Excuse me; I think there is everything to warrant it. We are now passing through a season of temporary dullness incident to the reaction from the extreme activity and unhealthy appreciation in value which followed the startling discovery that the world's consumption of iron had run far ahead of its production. I will not say that a panic followed this discovery, but it was almost a panic, followed in turn by what was almost a famine in iron. Since then a more equable relation has been established between the supply of iron and the requirements of the market. Again, high prices and the subsequent monetary stringency have together placed a check upon the consumption of iron, and even the slight decline in prices has unsettled the confidence of buyers. These, however, are but temporary conditions, through which the iron business is passing to a more substantial and permanent prosperity. Iron is a commodity in which no permanent economy of consumption is possible, and if we use less this year we must use proportionately more the next, or during some succeeding year when the average will be made good. Now gentlemen, I fail to see how it is possible for you, as manufacturers of iron stoves, to fail of reaping permanent benefit from any prosperity which may overtake the iron trade. We are only beginning to realize vaguely and indefinitely what a magnificent future lies before us, or how this great nation is rising in the majesty and strength of a young and vigorous civilization to take the place of time-worn England as the world's producer of cheap commodities for export. I wish I could give fitting expression to my faith in the future, and I thank God that I am a young man, and that if spared to attain the age of some who kindly honor me with audience, I shall see this country first and greatest among nations in all that contributes and conduces to the welfare and happiness of mankind.

On motion of Mr. Mitchell, of Pittsburgh, the thanks of the convention were tendered to Mr. Bayles, and his paper was ordered published with the proceedings.

Mr. Alexander Selkirk, of the *National Stove Trade Gazette*, made a few remarks introducing his journal to the trade.

Mr. Chamberlain, Cincinnati, moved that the thanks of the convention be tended to Mr. S. S. Jewett for his liberality in furnishing the members with tickets for Goat Island, Prospect Park and Suspension Bridge. The motion was adopted.

Mr. Jewett offered the following:

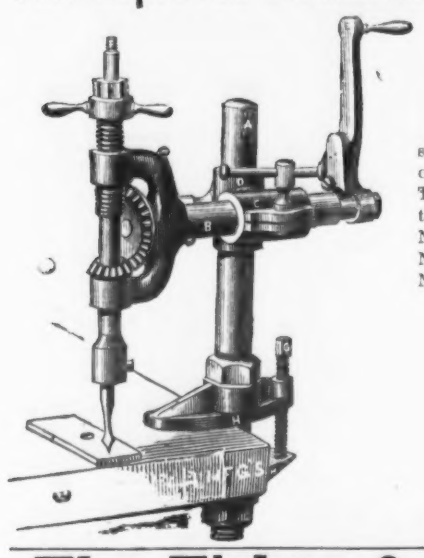
Resolved, That this Convention tender to our honorable President their thanks for the able and dignified discharge of his duty, and especially for his very able and valuable address to this Association.

The resolution was put by Mr. Jewett and adopted by a rising vote.

The Secretary then read a number of letters from members of the trade expressing their regrets at being unable to be present, and promising to stand by the action of the convention.

On motion of Mr. Bradley, the convention adjourned to meet at Albany on the second Wednesday in February next.

The Improved Patent Universal Angular and Ratchet Drilling Machine,



Adjustable to any angle, and easily carried to any part of the shop for making Repairs.

Over 4000 of these machines are now in use, and the demand is steadily increasing.

Dealers will find them of ready sale and at satisfactory profits.

These machines were formerly sold by Messrs Holland & Cody, and Duryea & Kelley, but since the Miller's Falls Co. purchased the patent and began to make them exclusively in their own shops, the quality and finish has much improved, and they are now really desirable goods. These Drilling Machines are for sale in most of the larger cities at our regular prices, but where they are not so kept we will supply them on demand.

No. 1,	weight 26 lb.,	Drill	⅝ in.	hole	Price, $34·00
No. 2,	" 52 lb.,	"	1	"	" 38·00
No. 3,	" 106 lb.,	"	1⅛	"	" 65·00

With usual trade discount.

MILLERS FALLS CO.,

78 Beekman Street, New York.

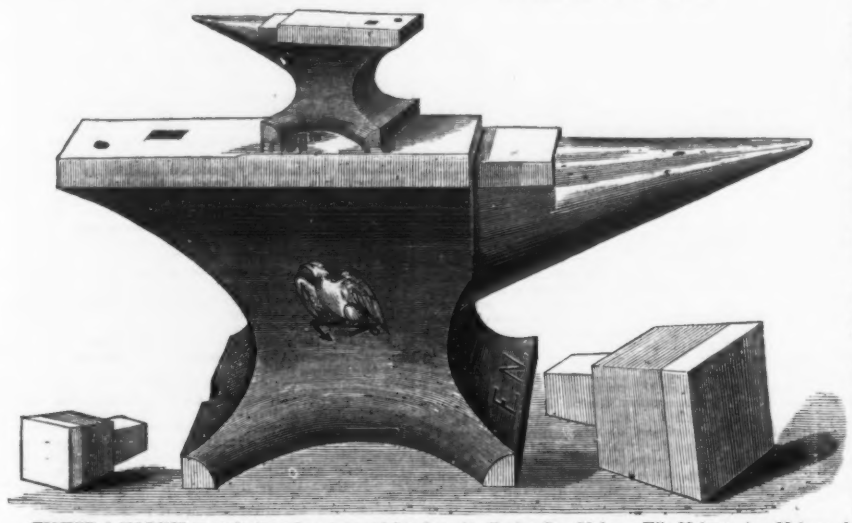
Factory at Millers Falls, Mass.

ALSO MANUFACTURE

Barber's Bit Braces and Parallel Vises.

The Fisher & Norris Eagle Anvil Works.

(ESTABLISHED 1843.)



These Anvils are manufactured at the oldest Anvil Factory in this country, and for the past twenty-five years have maintained an excellent reputation among Blacksmiths, Machinists, Tool Makers, &c. They are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The working surface is in *one piece of* JESSUP'S BEST TOOL CAST STEEL, which, after being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

The best of English Anvils, after a time, become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils being of crystallized iron, no such settling can ever occur; and the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more *solid* material, and consequently with less rebound, the piece being forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as is the case from a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil which is more elastic.

FISHER & NORRIS manufacture also, to special order, Anvils for Saw Makers, File Makers, Axe Makers, &c; also, Copper Smiths', Silver Smiths' and Tinmen's Stakes and Blocks, with hardened and polished cast steel faces, and the well known Double Screw Parallel Vise.

PRICE LIST, May 1st, 1873.

ANVILS weighing 100 lbs. to 600 lbs., 12 cts. per lb.

Smaller Anvils, ("Minims.")

No. 0	1	2	3	4	5	6	7	8	9
Weighing about 10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Price, $4·00	$5·00	$6·00	$6·50	$7·00	$8·00	$9·00	$10·00	$11·00	$11·50

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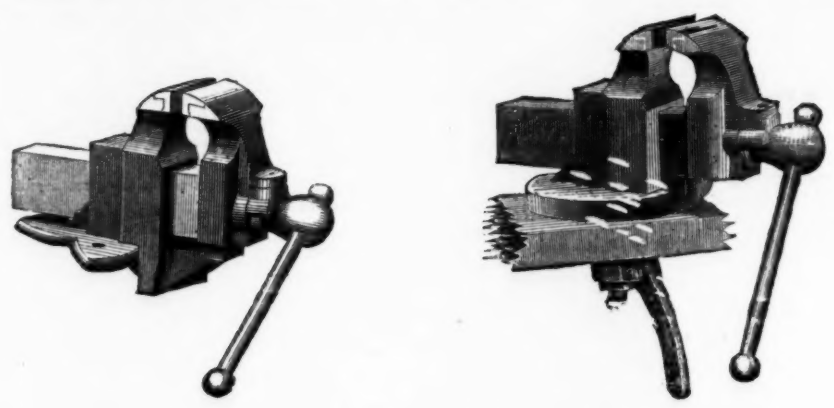
New York.—Messrs. CLARK, WILSON & CO.—RUSSELL & ERWIN MANUFACTURING COMPANY.—Messrs. DURRIE & RUSHER. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE.

FISHER & NORRIS, Trenton N. J., Manufacturers.

HOWARD

PARALLEL BENCH VISE.



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HOWARD IRON WORKS,

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WILSON MANUFACTURING COMPANY.,

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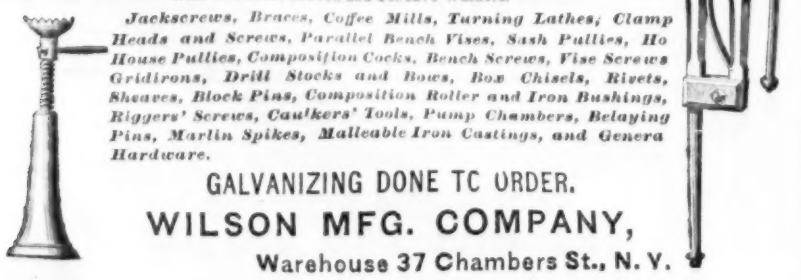
MANUFACTURERS OF

SOLID BOX VISES.

With or without Convex and Concave Washers.



Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads and Screws, Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and Genera Hardware.

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IMPORTERS & JOBBERS.

Real Bronze Door Knobs,

BUTTS, &c.

Golden Bronze Knobs

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Round and Hexagon inside and outside Door Knobs, and combined Escutcheon; beautiful patterns and superior finish, retaining color; Real Bronze. The list includes several SPECIALTIES—the cheapest and best bronze work offered. Bell Pulls, Sash Lifts, Shutter Bars, Sash Fasteners, Escutcheons, Bell Levers, &c.

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The largest stock of Fire Brick of all shapes and sizes on hand, and made to order at short notice.

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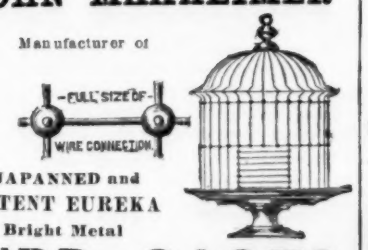

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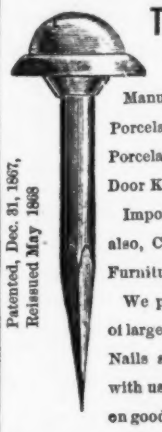

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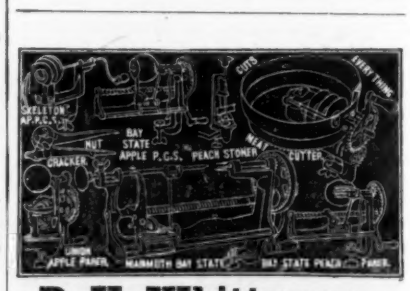

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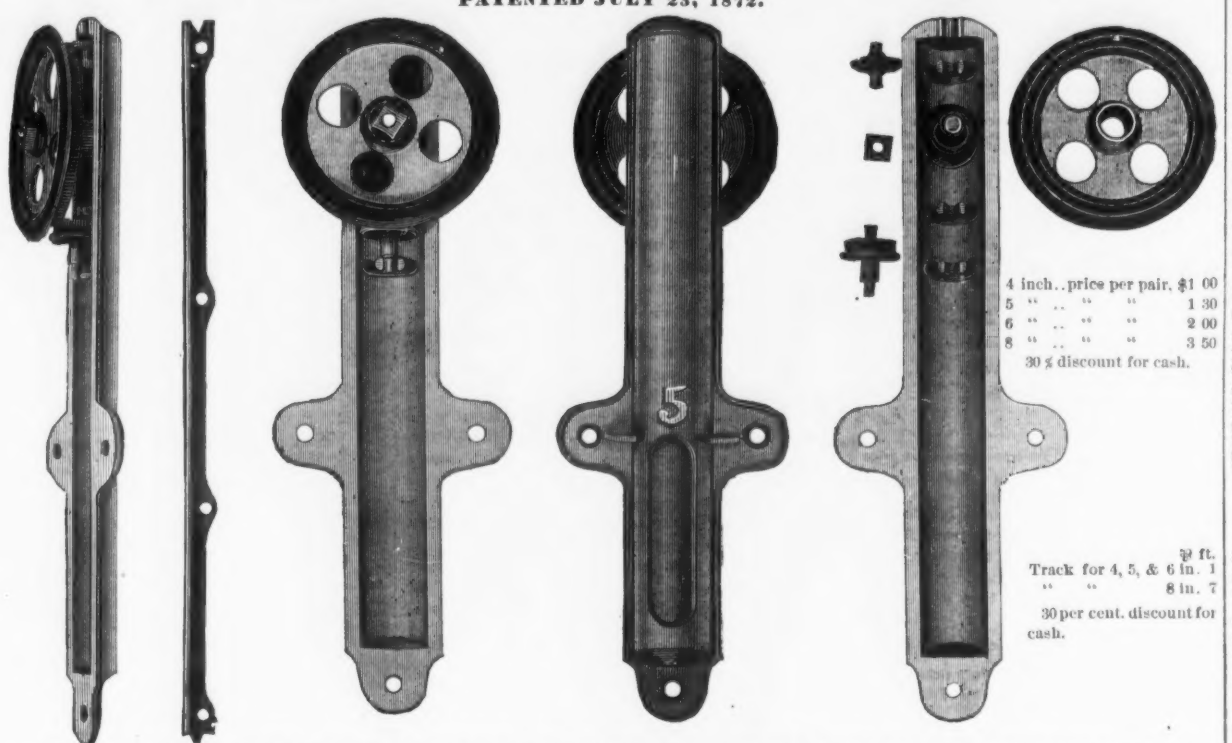

4 inch..price per pair, $1 00
5 " .. " " 1 30
6 " .. " " 2 00
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30 % discount for cash.

Track for 4, 5, & 6 in. ₱ ft. 1
" " 8 in. 7

30 per cent. discount for cash.

We, without hesitation, offer this Hanger as the best article in the market for the purpose. Its many advantages over all other Hangers are as follows:
1st.—It is more than **double as strong** as any other Hanger, owing to its semi-cylindrical or curved back.
2nd.—It is provided with a friction wheel at the top of the Case, which bears against the rear or outside of the sheaves, and prevents it from **leaning outward** and causing it to **RUN TRUE,** a feature not attained in any other Hanger.
3d.—By thus causing the sheave to run true, the doors are always held up **Close to the Frame,** and maintain a close joint around it.
4th.—The sheave has but one flange, there being a lower friction wheel provided with a flange which extends out under the face of the sheave and bears against the outer side of the track, which takes the place of the extra flange in the sheave, thus doing away with the **grooved sheave** which always grinds or breaks.
5th.—**IT CAN NEVER RUN OFF THE TRACK.**
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Have constantly on hand a large supply of COAL, RAIL ROAD AND CALIFORNIA OR MINERS' PICKS. We claim that OUR PRICES ARE LOWER and our picks are SUPERIOR to any thing in this country.
Liberal discount to large dealers. Send for price list. To insure attention all communications must be addressed to **H. H. TRENOR, Treas.**
Post Office Box 3170. **New York Office, 61 and 63 Park Place and 5 College Place,**
J. J. Anderson, Prest. **Henry H. Trenor,** Treas. **John H. Allen,** Secy.

Scientific and Technical Notes.

Considerable attention has of late been attracted to the

SPECULAR IRON ORES OF ST. LAWRENCE CO., N. Y.

on account of their unusual purity. Many of these ores are almost pure peroxide of iron. In the same locality are extensive deposits of magnetic ores. One of these veins, known as the Dodge vein, averages 20 feet in thickness for a distance of 400 to 500 feet. It is contained between walls of granitic gneiss, and is associated in places with white calcite, mica, garnet and other minerals. Immediately above the vein is a bed of white calcite from 12 to 15 feet in thickness, which is opened by a tunnel, and affords a flux of excellent quality. An analysis of an average sample of ore from the Dodge vein shows the following composition:

Magnetic oxide of iron	79·29
Oxide of maganese	0·35
Alumina	3·45
Lime	4·46
Magnesia	3·09
Sulphur	0·35
Phosphoric acid	0·32
Silicic acid	8·32
Water	0·51
	100·14
Percentage of metallic iron	57·42

At a charcoal furnace situated about two and a half miles from this vein, this ore was for some time smelted exclusively; the flux used being a very impure limestone, carrying considerable quantities of green pargasite disseminated in grains. The quantity of silicon found in the pig metal from this furnace, together with the sluggish character of the slags formed in the furnace, are probably to be attributed to the peculiar composition of this flux. Samples of this metal were analyzed as follows:

	No. 1. Close Grain Gray Pig.	No. 2. Close Grain Gray Pig.
Carbon	3·44	3·30
Silicon	2.21	4·48
Manganese	0·11	0·12
Sulphur	0·04	0·11
Phosphorus	0·22	0·15
Iron and undetermined matter	93·48	91·84
	100·00	100·00

These ores were roasted in open heaps with wood and charcoal dust before smelting. The pig metal contains phosphorus in too large proportion to adapt it for the Bessemer process, and yet specimens may be selected from the vein of ore showing only three hundreths of one per cent. of phosphoric acid. In these ores titanic acid is wholly absent, while the only serious objection to them consists in the phosphoric acid they hold as above stated.

Mr. W. E. Everitt, of Birmingham, has invented an improved method for

WITHDRAWING THE CORES FROM HOLLOW INGOTS,

from which brass, copper, and other tubes are made by the drawing process, but which may also be used for drawing tubes of short length. The machinery consists of a sliding cross head carrying a pair of gripping plyers, the said cross-head having a slow reciprocating motion given to it by a crank pin and connecting rod, the cross-head having a short rest at each end of its stroke. This drawing apparatus is used to withdraw with great force from the hollow or tubular ingot a cylindrical mandrel, having an enlarged rear end and provided with cutting tools. In using the machinery the workman takes the hollow ingot with its core and hollow core bar and introduces into the said hollow core bar the mandrel described. The fore end of the mandrel is passed through a collar in front of the drawing apparatus, and being gripped by the plyers is drawn by the motion of the cross-head through the hollow ingot, which is prevented from advancing by the collar described. As the mandrel advances it withdraws by its enlarged head the core bar from the core, while the cutting tools immediately following cut up or divide the core. By the time the cross-head has completed its stroke the mandrel has been drawn through the whole length of the hollow or tubular ingot, the hollow core bar has been removed, and the core itself so cut up or divided that it falls from the hollow ingot.

Pittsburgh claims to have in process of construction the

MOST POWERFUL PAIR OF ENGINES IN THE WORLD,

and sustains her claim by the following comparisons: Reducing the capacity of some of the largest pumping engines to a uniform lift of one foot high in 24 hours, it is found that the one at the Lehigh zinc mines will lift 3,456,000 gallons; the pair at the Chicago Waters Works, 4,500,000,000 gallons; the pair at Haarlem, Holland, $1,000,000,000 gallons; while the new Pittsburgh engines will, it is persumed, lift 14,240,000,000 gallons. The pair will weigh 1500 tons and will cost $420,550. The following dimensions will serve to give some idea of their magnitude. Cranks, 9 tons; shaft, 24 tons; four sections of the two valve chambers, 124 tons; fly wheel, 70 tons. The four plungers will weigh upward of 400 tons. Cylinder, 64 inches diameter; stroke, 14 feet. This 40 inch diameter, 11 feet stroke. This ponderous piece of machinery will be used to raise water into the Highland avenue reservoir in Pittsburgh, a hight of 356 feet. It is estimated it will raise 70,000,000 pounds of water for each 100 pounds of coal consumed, the cost being at the rate of 1 cent. for every 3070 gallons.

We learn from the Denver *News* that a company of capitalists are considering the practicability of

TUNNELLING THE ROCKY MOUNTAINS.

The idea is to tunnel the mountains from a point about one mile below Black Hawk to the Middle Park, running in a north-westerly direction. The tunnel to be run will, it is presumed, cut many rich veins of gold and silver, and thus a great mining interest be developed. Money for the prosecution of the work has been subscribed, chiefly by English capitalists, who are sanguine of the ultimate success of the enterprise. The tunnel, when completed, will be 12 miles in length. It is intended to make it large enough to be used for railroad purposes, and so, if a railroad is ever to be constructed to the Middle Park, it will find its most convenient route through the tunnel. It will be called the Sierra Madre Tunnel, and the incorporation papers for its organization have already been filed. George W. Heaton, a gentlemen well versed in matters of this kind, will have business charge of the operations of the company.

The Early History of Steel Tires.

BY JAMES A. WHITNEY, M. E.

In these days, when the utility of steel tires for locomotives is universally acknowledged, and their adoption a fact widespread, we are apt to lose sight of the successive steps by which an improvement so advantageous in its results has been brought about. For steel tires, no more than any other advance in arts or industries, has not been a sudden development, but rather an affair of slow growth. The present memoranda commences with the English patent of James Hardy, dated June 2, 1838, from which, up to their general adoption, the history of steel tires is one of continual experiment, mingled with many ingenious projects never very thoroughly tested. In Hardy's invention, bars of iron and steel were fagoted in peculiar fashion, and then welded either by passing through rollers or by being subjected to the action of a tilt-hammer—the steel being so arranged in the fagot as to be brought to one surface of the bar made therefrom, and consequently to the outer circumference of the tire when finished.

It was four years after this that Sydney Jessop proposed a plan of providing a steel wearing surface on wheel tires, the invention being also applicable to rails and other articles requiring unusual hardness at some parts and due toughness at others. The invention consisted—I quote from the abridgment of the specification—"in the preparing of such wrought iron as is intended for wheel rims, wheel tires, rails, tramplates, switches, and such other like articles, having a wearing surface or wearing surfaces exposed to more friction than their other surfaces, by placing them in a carbonizing furnace in such manner as to expose what is intended to be their wearing surfaces only to the processes of carbonization, and protecting their other surfaces therefrom by suitable arrangements of position and fuel, and afterward rolling, hammering, swaging, or otherwise consolidating the metal on such surfaces, so as to make it hard, even, and compact all over."

What, aside from certain modifications, appears substantially a revival of Hardy's method, is shown in the plan of Jonathan Saunders, in 1843, the pile being formed of alternate layers of iron and steel, heated to a welding heat, and brought to the form of a bloom by hammering; after this the bloom was rolled to shape, to form the "tire-bar," or blank, from which, by a subsequent operation, the tire itself was formed. In some cases, possibly to prevent burning the steel surface, the pile was so made that a thin layer of iron was left external to the steel on the bar, this layer being afterward removed from the perimeter of the tire, during the operation of turning true in a lathe.

In 1844, John Bower Brown devised a method of "combining cast steel with iron," in which an ingot of the last named metal was placed in a mold having a capacity greater than the size of the ingot, the latter being first heated nearly to the point of fusion. The molten steel was then poured around the iron and presumably united with its pasty surface. In the abstract before me no mention is made of the manner in which this compound block was brought to annular form. But it is quite likely that there was contemplated the plan favorably tried at a much later day, of forming a hole in the center which, gradually enlarged, at last brought the whole to the shape of a gigantic weldless ring, fashioned into a complete tire by simple, but ingenious arrangements of pressure and forming rolls.

In 1845, Henry Smith advocated the forming of compound steel and iron tires by coiling strips of metal spirally about a mandrel, and then flattening them together under a welding heat. He also proposed, "turning the outer peripheries of railway wheels while in a heated state, such state facilitating the turning." The spiral coil, both of steel and iron combined, and of iron alone, has been frequently reinvented since Smith's invention, but, notwithstanding its theoretical advantage of resisting tensile strain, it does not seem to have met with much favor from practical men, doubtless because of the manifest difficulty, especially with the comparatively imperfect workshop appliances of thirty years since, of forming a perfect weld between the contiguous surfaces.

The first "all steel" railway tire of which I find mention in the authorities at hand, was patented in England, as a communication from abroad, in 1852, and the claim was to "manufacturing tires and hoops, each tire or hoop being formed from one bar or piece of cast steel, without weld or joint." As I imagine this to embrace the essential elements of more recent steel tire practice, I quote the abridgment in full, as follows:

"An ingot of cast steel is first subjected to a forging or hammering process, by which it is rendered tough and compact, the ends of the ingot or bar being at the same time brought into an enlarged or circular form. An anvil having in it a suitable recess, is then used to give to the bar a form resembling the section of a double tyre, there being a flange formed on each side of the bar, and the two circular ends of the latter have then each a hole drilled or punched into it; and the bar is then cut or split by suitable means along the center, from hole to hole, and the circular ends are hammered in order to harden and compress the metal at those parts, having been previously somewhat expanded, and the corners of the openings of the holes, leading into the cut or slot, being rounded off. The slot is then widened by the use of wedges or keys, and the bar is then placed in what the patentee terms a 'drawing frame,' in which, what are called 'horks,' are used to draw the bar into a form approaching that of a circle, these horks being inserted into the slot in the bar, and one being moved away from the other by means of a rack and gearing, or both being moved, so as to distend the two sides of the bar. This distension having been carried to as great an extent as may be desirable, the bar is finally brought into a circular form by the use of anvils, hammers, and segmental pieces, which may be moved radially by screws or wedges, being lastly turned in a lathe." It will be seen that while the central idea of this project, that of forming a weldless steel tyre, is a good and feasible one, the devices proposed as a means to this end were crude, clumsy and complicated. Indeed, it requires in every improvement, the addition of multitudinous minor aids to the original, in order to achieve that degree of utility which the commercial public is willing to pay for, and which alone constitutes success.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, June 25, 1873.

The past week has been dull and comparatively uneventful, and we have but little of interest to note. Money has been very easy at 3@6 per cent. for call loans, and prime mercantile paper has been freely bought at 6½@8 per cent. Merchants generally seem to be adopting a conservative policy, and look forward to another stringency, when the banks are drawn upon for currency to move the crops. Under the present banking law there is no means of guarding against these periodical seasons of tightness in money, so far as the national banks are concerned, and the only recourse for our merchants lies in the establishment of banks for discounts and deposits, under such management as shall entitle them to the entire confidence of the public. It is less an increase of the circulating medium that is wanted, than a greater elasticity of bank credits at times when the national bank loans have reached the legal limit of expansion, and since Congress has manifested no disposition to relieve the banks subject to its laws of the restrictions now imposed upon them, our business men will have to provide their own remedies for the evils attendant upon stringency in money. The bank statement for the week was favorable, the banks holding $12,166,375 lawful money above a 25 per cent. requirement, which only the national banks are submitted to. The national banks have a percentage of reserve to liabilities of 30·34, the state banks of 26·88, making the average of both classes 29·91. The following is a comparison of the averages of the past two weeks:

	June 14.	June 21.	Differences.
Loans.....	$377,714,400	$378,903,800	Inc. $1,189,400
Specie....	26,967,600	27,398,300	Inc. 430,700
Circ'lation.	27,402,700	27,352,000	Dec. 50,700
Deposits...	218,171,100	220,392,500	Inc. 2,221,400
Leg. Ten..	46,397,000	46,704,200	Inc. 307,200

Gold has further declined, and the market has been dull and heavy, foreign exchange ruling below the point of profit in shipments. The prepayment of July interest will begin on the 25th and 28th for coupon and registered bonds respectively.

The following shows the daily range of the premium:

	Highest.	Lowest.
Thursday	116	115⅞
Friday.....	115⅝	115⅛
Saturday	115⅞	115⅛
Monday.....	115⅞	115
Tuesday.....	115⅝	115⅜
Wednesday.....	115⅝	115⅜

The stock market has been wholly without animation. The death of Mr. H. F. Clark creates some uncertainty respecting the future of certain important railways, and promotes dullness in the very shares which are usually most active. The highest and lowest of to-day's quotations are given below.

Government bonds are dull and have declined here in sympathy with gold, and in London on account of the greater activity in money.

Railway bonds are strong on a very small investment demand.

The foreign trade movements for the week are shown as follows:

IMPORTS.

	1871.	1872.	1873.
Tot. for week..	$7,552,238	$7,918,883	$5,790,953
Prev. reported.	178,849,119	210,918,985	198,864,823
Since Jan 1...	$186,401,347	$218,837,868	$204,655,775

Included in the imports of general merchandise for the week are:

	Quant.	Value.
Anvils.....	46	$931
Brass goods.....	8	441
Bismuth.....	2	1,100
Bronzes.....	17	3,134
Chains and anchors.....	88	8,350
Copper	...	4,433
Cutlery.....	68	17,757
Gas fixtures.....	6	...
Guns	13	1,111
Hardware.....	58	6,826
Iron, hoop, tons.....	52	4,933
Iron, pigs, tons.....	1,526	57,324
Iron, sheet, tons.....	21	2,433
R. R. bars.....	11,755	204,502
Iron, other, tons.....	557	32,771
Lead, pigs.....	500	2,851
Metal goods	171	18,853
Needles.....	4	4,226
Old metal.....	...	936
Platina.....	2	3,305
Plated ware.....	2	284
Per. caps.....	5	1,010
Saddlery.....	8	1,866
Steel.....	5,553	21,302
Spelter.....	55,250	3,380
Silverware.....	2	157
Tin, boxes.....	23,070	218,835
Tin, bbls.....	5	731
Tin, 415 slabs.....	19,000	4,760
Wire.....	301	10,447
Zinc.....	5,520	474

EXPORTS, EXCLUSIVE OF SPECIE.

	1871.	1872.	1873.
For the week.....	$4,976,521	$4,395,843	$5,728,915
Prev. reported.....	105,614,570	97,437,497	128,912,005
Since Jan. 1.....	$110,591,091	$101,833,340	$134,640,920

EXPORTS OF SPECIE.

Total for the week.....	$1,067,891
Previously reported.....	23,859,519
Total since January 1, 1873.....	$24,927,410

Government bonds closed strong. We quote:

	Bid.	Asked.
U. S. Currency 6s.....	114½	114½
U. S. 6s, 1881, reg.....	116¾	116¾
U. S. 6s, 1881, c.....	122⅞	122⅞
U. S. 6s, 5-20 reg. May and Nov.....	116	116¼
U. S. 6s, 1862, c.....	116¼	116½
U. S. 5-20 1854, c.....	116¾	117
U. S. 5-20 1865, c.....	118	118⅛
U. S. 5-20 1867, r. Jan. and July.....	115¼	115⅜
U. S. 5-20 1865, c. Jan. and July.....	119⅞	120
U. S. 5-20 c. 1867 " "	120⅜	120⅞
U. S. 5-20 c. 1868, " "	120¾	120¾
U. S. 10-40 reg.....	112¾	112⅞
U. S. 10-40 c	113¾	114
U. S. 5s 1881 cou.....	114⅛	114⅝

The following were the highest and lowest prices of stocks to-day:

	Highest.	Lowest.
N. Y. Cen. & Hudson Consolidated..	101¾	101½
Lake Shore.....	92¾	92⅜
Rock Island	109	108¾
Del. Lack and Western.....	97¾	97⅜
Wabash.....	67¾	67⅜
Harlem.....	126⅜	125¾
Western Union Telegraph.....	85¾	84⅞
Northwestern.....	71	70⅜
Milwaukee & St. Paul.....	51¾	50⅜
Pacific Mail.....	38¾	37⅜
Erie.....	63¾	63
Ohio & Mississippi.....	38¾	38⅛
Boston, Hartford & Erie.....	2¾	2⅜
Union Pacific.....	24¾	24⅛
C. C. & I. C.....	28	27⅜
Atlantic & Pacific preferred.....	23	22

GENERAL HARDWARE.

Business is still very dull, but hopes are generally felt of a good fall trade, which ought to begin soon. Some travelers will start next week and some the week after. The tightness of money and the dullness of trade for the past two or three months have prevented any accumulation of goods in the hands of either manufacturers or dealers, and the opening of the fall trade will not find any class of the trade with large stocks, so that, unless something unforeseen should happen, a good wholesome business may be looked for during the balance of the year. There seems little probability of any general decline in prices. Of those goods into which pig iron enters largely the prices were fixed at a time when the raw material was lower than it is now, and lower than it seems likely very soon to go; and unless there should be a falling out among the makers, leading to an unfriendly competition, or a great and improbable fall in the price of iron should occur, there seems no reasonable prospect of any considerable cheapening of these goods. The break in the price of Strap and T Hinges and Wrought Butts continues without any signs of being "patched up," as similar difficulties have been. The formation of a reliable combination on these goods is rendered difficult by the number of concerns engaged in their manufacture, and the widely different conditions under which they are made.

Several of our manufacturers of Hardware having warehouses in this city had goods destroyed by fire on the docks of the New Haven Steamboat Co., on July 4th, 1866. Suits were brought against the company for recovery of the value of the goods thus destroyed, and the matter has been carried through the courts, with decisions *pro* and *con*, until in the later trials and on appeal the decisions in favor of the owners of the goods have been sustained. The responsibility of common carriers as insurers until goods have been taken away from their premises, or notice and opportunity for removal has been given the owners thereof, was established. The aggregate amount involved was very large.

On the 24th instant the manufacturers of Cordage reduced the price of Manila, Sisal, and New Zealand Cordage half a cent per pound. Below will be found the revised price list of William Wall's Sons:

Manila Cordage, sizes above 12 th'd.....	18 cts.
" " 6 th'd and 9 th'd (¾ in. and 5-16 in. diam.).....	19 "
Manila Cordage, 12 th'd (¾ in. diam.).....	18½ "
" Hay Rope.....	19½ "
" Cordage, bolt rope yarns.....	20 "
" " " " 6 th'd and 9 th'd	21 "
Tarred Manila.....	17½ "
Fine Tarred Manila Lath Yarn.....	19 "
Sisal Rope, sizes above 12 th'd.....	15½ "
" 6 th'd and 9 th'd.....	16½ "
" 12 th'd and Hay Rope.....	16 "
New Zealand Cordage, sizes above 12 th'd.	15½ "
" " 6 th'd and 9 th'd (¾ and 5-16 in.).....	16½ "
New Zealand Cordage, 12 th'd (¾ in.) and Hay Rope.....	16 "

In foreign Hardware there are no changes to note, the demand, as is usual at this season of the year, is very light and confined to the supply of actual present wants. It is generally believed in importing circles that for leading Hardware goods of foreign manufacture the stocks throughout the country are light, necessitating an early fall demand, and this belief, coupled with a much easier money market than has ruled for some months past, has strengthened the views of holders, and we hear of no tendency to force sales.

The Nail trade is in the same unsatisfactory condition mentioned in our last, and buyers of large lots would experience no difficulty in placing their orders at $4·50 rates, net. For lots of 100 kegs, orders have been placed at $4·65 for 10d., but $4·70 @ $4·75 is the general asking rate. We quote Nails in lots less than 100 kegs $4·70 @ $4·75; 100 kegs and over, $4·65; 500 kegs and over, $4·50 rates, net. The demand is fair for this season, and the total sales for June will rather exceed in quantity the sales for June 1872. It is generally conceded amongst large operators that the supply of Nails, both East and West, is considerably in advance of the demand, and the project to shut down the mills for a few weeks is received with considerable favor. We mentioned last week that this matter was being seriously discussed by the Pittsburgh mill owners, and this week we learn that several Eastern mills have a similar course in contemplation.

The American Screw Co. have declared a dividend of $20 on each share, payable July 1st.

The following are Lewis, Oliver & Phillips' revised prices. We received them too late to correct our list on the 27th page.

Iron, standard list, assorted sizes, for large orders, 3·8c, card rate, 2 % off net.
Iron Wedges..... 5½c ₩ ℔ net
Norway Nail Rods..... 9½c ₩ ℔ net
Fence Pickets—
⅜ round, bent to shape. 30c ₩ ft. of fence, less 5 % off net
Discount off Standard List.
Carriage and Tire Bolts (new list)..... 60&15 % off net
Plow Bolts..... 25 % off net
Stove Bolts..... at the list price
Machine and Square Head Bolts..... 35 % off net
Coach and Lag Screws..... 35 % off net
Bolt Ends..... 30 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in..... 6 c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 2 in..... 4½c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in..... 7 c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in..... 5 c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, 1c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, 1c ₩ ℔ ex.
Harrow Teeth, in lots of 1 ton or more, packed in casks, 1 in. diam. 5c ₩ ℔ net; ⅞, ¾ in. diam. 5c ₩ ℔ net; ⅝ in. diam. 5½c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in casks, ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 5 kegs or more, ⅝ in. diam. 8c ₩ ℔ net; 9-16 in. diam. 8c ₩ ℔; ½ in. diam. 10c ₩ ℔. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Screw Hook-and-Eye Hinges, ⅛ to 1 in. diam. 9½c ₩ ℔ net; ⅝ in. diam. 10½c ₩ ℔ net; ½ in. diam. 12½c ₩ ℔ net.
Screw and Strap Hinges, in lots of 100 pairs or more, 14 to 36 in. long, 7c ₩ ℔ net; 8, 10 & 12 in. long, 8½c ₩ ℔ net.
Strap and T Hinges..... 20 % off net, delivered
Screw Hinging Rings..... $6 50 ₩ 100 net
Duck Nest Tuyere Irons..... $16 00 ₩ doz net
Cast Iron Washers..... ₩ ℔ 4½c net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long..... ₩ ℔ 5½c net
1 to 2 in. diam. from 4 to 8 ft. long..... " 5½c net
1 to 2 in. diam. from 1½ to 4 ft. long..... " 6 c net
⅞, ¾ and ⅝ in. diam. over 4 ft. long..... " 6½c net
⅞, ¾ and ⅝ in. diam. from 1½ to 4 ft. long " 6¾c net

WAGON HARDWARE.

Wagon Box Strap Bolts—						
10 in. long by 7-16 at Screw End, ₩ set of 8 bolts..						55c
12 "	⅜	"	"	8	" ..	70c
10 "	9-16	"	"	8	" ..	} 90c
12 "	9-16	"	"	8	" ..	
14 "	9-16	"	"	8	" ..	$1 00
10 in. long by ⅝ at Screw End, ₩ set of 8 bolts..						} 1 00
12 "	⅝	"	"	8	" ..	
14 "	⅝	"	"	8	" ..	1 10
16 "	⅝	"	"	8	" ..	1 20
5c ₩ set for each additional inch over 14 in. All lengths made.						
Wagon Box Rods, narrow track, each.....						18c
" " wide track, each.....						20c
Single Tree Irons, ₩ set of four pieces.....						36c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....						60c
" " 3 " " "						65c
" " 3¼ " " "						70c
" " 3½ " " "						75c
Wagon Brake Ratchets, each.....						16½c
" " finished with guard, each.						45 c
Wrought Hammer Straps, heavy pattern, each.....						16 c
" " " light " each.....						15½c
" Rub Irons, each.....						11 c
Stay Chain Hooks, each.....						8 c
Double and Single Tree Clips, figure 1, each.....						9 c
" " " 2, each.....						10 c
" " " 3, each.....						12 c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks and Clips, in lots of 100 sets.....						dis 25 %
Wagon Box Staples, 1½ to 2½ in. to clinch. ₩ 1000						$15 50 net
" " Box Iron, to rivet on. ₩ 1000						9 50 net
Neck Yoke Eyes, each.....						5½c net
" " with ⅝ rings, each.....						8½c net
King Bolts, ¾, 1, 1¼, and 1½ in. diam.....					₩ ℔	5¼c net
Wagon Rivets, ex. large, oval and steeple head, ¼ in. diam. all lengths.....					"	10 c net
Wagon Rivets, 3-16 in. diam., all lengths.....					"	12 c net
" & Nails, in 5 ℔ paper boxes....					₩ ℔	1c extra
" " in 25 ℔ wood "					"	½c extra
Wagon and Hinge Nails, ¼ in.....					₩ ℔	17 c net
" " 5-16 in.....					"	19 c net
Double Tree Plates.....					} "	9 c net
Coupling "						
Tongue "						
Neck Yoke Plates.....					"	12 c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.						
Wagon Chains, Stay Lock and Tongue, 5-16 in, ₩ ℔ net; ¼ in., 12½c. net						11½c

The Hart, Bliven & Mead Mfg. Co. have their complete Catalogue almost ready for distribution. They have prepared a circular, from which we quote the following statement of the terms and conditions on which they will be issued to the trade:

We have issued two new Catalogues as follows:

First—One containing only articles actually made by us at our several factories.

Second—One containing not only the articles we make, but all articles of American, English and German Hardware usually sold.

These are the most elaborately illustrated, complete and useful Catalogues yet issued for the use of hardware dealers.

In consequence of the heavy expense attending the publication, we deem it proper to state now that we shall only distribute them as follows:

One copy of the first issue will be sent (if not already sent) free of charge, to each Hardware Jobbing firm with first goods ordered.

One copy of the complete Catalogue will be sent, free of charge, to each Hardware Dealer with first goods ordered; or if ordered by express, without goods, we will charge $4·50, and remit the charge on receipt of subsequent orders.

All extra copies of the complete Catalogue will be charged at $4·50 per copy, and sent as directed, with expenses to follow.

In our new Catalogue many changes in list prices of our own make of goods have been made. From these list prices discounts will be made from time to time, as the cost of production and market values dictate.

All orders for goods of our own manufacture, after this date, will be executed at our new list prices and discounts.

We would call attention to the Patent Self-Righting Cuspadores, manufactured by J. D. Farrington, Jr., 38 Murray street. These goods which are a great improvement, both as regards appearance and utility, on the ordinary spittoon, recommend themselves to consumers, chiefly for what their name implies, their self-righting qualities. The manufacturer, in a circular dated 13th instant, says: "The Self-Righting Cuspadore cannot break and cannot upset. If thrown on its side it rights itself immediately, the lower part being made of cast iron. This makes it just the thing needed for railroad cars, steamboats, hotels and restaurants." An illustration and price list of these goods will be found in advertisement on 25th page.

IRON.

American Pig.—The market for American Iron remains in just about the same position as noticed for several weeks past. The companies generally ask $50 for No. 1 Iron delivered at Hoboken, while outside parties are offering lots at decidedly lower figures. The demand for consumption continues very light, most of the larger manufacturers running on short time, and all limiting their purchases to the smallest possible quantity, not caring to lay in any supply in the face of the present unsettled condition of Scotch Iron, and the exceedingly dull demand for their products. The transactions since our last have been small, and we only hear of 75 tons Bushong No. 1 at $45, and 100 tons do. on private terms. This brand, however, is generally held at $47. We quote: No. 1, $46 @ $50; No. 2, $43 @ $45; and Gray Forge, $38 @ $40.

Scotch Pig.—The steamship companies are still bringing Iron here as ballast and pressing it on the market, they not appearing disposed to store it in the present dull condition of the trade. This fact tends to keep the market unsettled, and but little improvement is looked for until the consumptive demand shall have become better. At present consumers are afraid to lay in any considerable supply, not knowing but that prices may even go lower. Considerable has been sold the past week at very low figures, but mostly taken by speculators. To go into the market to buy, stock could not be obtained at as low a figure as it has been sold for. We note sales of 300 or 400 tons Eglinton at $43 @ $44, 200 tons Eglinton at $42, 400 tons Glengarnock at $44 @ $45, 100 tons Glengarnock at $45·50, 300 tons Glengarnock at $43·50 @ $44, 150 tons Glengarnock at a private price, 200 tons Carnbroe at $42, and 200 tons Monkland on private terms. We quote at the close, Glengarnock at $44 @ $45, and Eglinton at $42 @ $43.

Following are the prices of Scotch Pig Iron in Glasgow, as reported by Messrs. J. E. SWAN & BROS., under date of June 6, 1873:

	No. 1	No. 3	No. 4
Gartsherrie.....	130/	116/	....
Coltness.....	130/	117/	....
Summerlee.....	130/	116/	120/
Langloan.....	130/	116/	....
Govan.....	117/	116/	115/
Calder.....	*130/	116/	....
Shotts, Bessemer.....	170/	165/	....
do Ordinary.....	130/	118/6	....
Carnbroe.....	122/6	116/	116/
Wishaw.....	118/	116/	116/
Monkland.....	122/6	116/	....
Chapelhall.....	130/	116/	....
Clyde.....	116/6	115/	115/
Quarter—Clyde.....	116/6	115/	115/

Glasgow Warrants 3-5, No. 1; 3-5, No. 3, g. m. b. 114/4½.

*f. o. b Glasgow, 1/ per ton, extra.

WEST COAST BRANDS—*f. o. b. Ardrossan.*

Glengarnock. } Ardeer..... }	122/6	116/6	....
Eglinton. } Lugar.... } Muirkirk. } Portland.. }	Branded Eglinton.	116/	114/ 115/
Dalmellington.....	116/	114/	113/

CURRENT RATES OF FREIGHT ON PIG IRON.

To	From Glasgow.	From Ardrossan.
New York.....	15/	15/
Boston.....	17/	17/
New Orleans.....	20/	20/
Baltimore.....	17/	17/6
Philadelphia.....	16/	16/
Providence.....	20/	15/

Bar.—There is very little doing in manufactured Iron, and but little improvement in demand expected until after the holidays. Prices continue weak and unsettled, and are generally about $2·50 per ton lower.

Old Rails.—The demand generally continues very light, and prices are unsettled and more or less nominal. A sale was reported early in the week of 500 tons T, but we were unable to verify it.

Rails.—There has been some inquiry for new English Rails, and sales effected of 1500 tons at a private price. The value, however, is without improvement, and still rules below the cost of importation. We quote at $67 @ $70, gold. American Rails are steady at $77·50 @ $80, currency, from the mills. A lot of about 4000 tons has been sold on private terms.

Scrap.—The demand for Scrap Iron continues very limited, and the price somewhat uncertain. We quote, nominally, at $45 for No. 1 Wrought, from yard. Sales 250 tons No. 1 (a ship lot) to go East, at $44·80. A lot of 500 tons, sold to arrive some time previously at higher figures, has just come to hand.

METALS.

Copper.—Manufacturers appear to be pretty well supplied for all present requirements, while there appears to be an entire absence of any speculative inquiry, and the market presents a quiet and uninteresting appearance. Prices in the absence of demand are weak and declining, closing at 28¼c. @ 28¾c. for round lots, and a fraction higher for small parcels. Sales during the week reach about 150,000 lb, at 29c. @ 29¼c. during the earlier portion, and 28¼c. @ 28¾c. toward the close. The stock of English Copper is pretty well cleared off, and as prices here are relatively much below those abroad, little if any fresh supply can be looked for. The value in consequence is wholly nominal. Manufactured Copper and Yellow Metal continues steady. We repeat former prices: 27c. for Bronze and Yellow Metal Sheathing, and 32c. for Yellow Metal Bolts, all net cash.

Tin.—Pig ruled quiet during the earlier portion of the week, but firm, with advices from England reporting an advance of £2, but later, with cable news of a still further enhancement, of £2 @ £3, and the market quoted at £140 @ £141, considerable demand sprung, up and free sales effected, embracing about 3500 slabs Straits at 30⅝c. @ 31¼c., gold, and 120 tons English at 30c. @ 30½c., gold. The close is very strong, with Straits held at 32c., gold, and English, 31c., gold, the stock here of the latter being very scarce. Banca Tin continues quiet and more or less nominal at 36½c. @ 37c., gold. The latest cable advices from Singapore quote that market at $35·25 per picul. The stock of Tin Plates is light, and with an active demand prices rule very strong. We quote: I. C. Charcoal, $11·25 @ $11·75; I. C. Coke, $9·25 @ $10; Charcoal Terne, $10·50 @ $10·75, and Coke Terne, $8·75 @ $9.

Lead.—The stock of foreign Lead here is moderate, but the large supply of domestic, with free offering at a slightly reduced range of prices, has weakened the market materially, and prices have declined, leading to rather more business. Sales include about 800 tons at 6½c. @ 6¼c., gold, for domestic, and 6¾c. @ 6⅝c., gold, for foreign. We quote Spanish and German ordinary at 6½c. @ 6⅝c., English at 6¾c. @ to 7c., foreign Refined 7⅜c. @ 7½c., and domestic 6½c. @ 6¼c., all gold. Manufactured Lead continues steady at 9¼c. for Bar, 10½c. for Sheet and Pipe, and 16½c. for Tin Lined Pipe, all less the usual discount to the trade.

Spelter and Zinc.—There is only a moderate demand for foreign grades, and sales confined to small parcels. We quote Silesian at 6⅝c. @ 6¾c., gold, and note sales of 50 tons within that range. Domestic brands continue quiet. We notice the sale of 20 tons Western at 8¾c. We quote at 8¾c. @ 11c., currency. Sheet Zinc continues quiet, but steady, at 10c., less 4 per cent., gold, from agents' hands.

Antimony.—The market for Regulus continues rather quiet. We only hear of sales of about 10 casks at 13¾c., gold.

PHILADELPHIA.

Messrs. BLAKISTON & COX, 333 Walnut street, under date of June 24, report as follows: *American Pig* moves slowly, and prices are unchanged. The decline which took place about the 1st of May has brought with it a better inquiry, and should the cost of purchasing remain at present quotations, the business of the coming months will be better than was the case when holders were disturbing the market with Iron at prices calculated to prevent transactions, and to weaken the market in the eyes of would be buyers. There is now no disposition to sell No. 1 at less than quoted prices, and this grade may be considered firm, many being of opinion that it will be scarce, and an advance take place. Transactions are chiefly confined to this grade. Rolling Mill Irons are more plenty and can be bought at low prices. Sales of No. 1 at $45 to $47, and No. 2 at $43 to $45, at the furnace, have been made, while Gray Forge sells at $35 to $37, and White and Mottled at $31 to $33, at the furnace. In *Scotch Pig* and *Scrap* there have been no transactions to note, and prices are nominal. Manufactured Bar sells from 3 9-10c. to 4c. per lb. as wanted at mill.

PITTSBURGH.

JUNE 21, 1873.—Trade generally continues dull and depressed, and the indications are not very favorable for an early improvement. As a rule the demand for manufactured goods has been unusually light thus far this year, but we are in hopes, notwithstanding the indications are not very bright, that the deficiency will be made up in the fall. In addition to a very limited demand, goods have been, and are still, selling at about cost, leaving little or no margin for the producer or maker. There seems to be a gradual shrinking going on in values of almost everything—manufactured goods along with the rest—and until the bottom has been reached—until people, both jobbers and consumers, become satisfied that this shrinking is about over, there will be no material improvement in the demand. The low price of farm products, particularly of grain and wool, is having its legitimate effect. Farmers generally—particularly in the West—are cramped financially. They are not realizing much over one-half for some of their principal products what they did last year. Hence, they are not able to make as many improvements as usual, and the result is a decreased demand for Iron, Nails, Window Glass, and manufactured goods generally. It is stated that there has been a large falling off in the demand for Mowers, Reapers, and agricultural implements generally, which goes to confirm what has already been stated. There has been rather more activity in Pig Iron this week, but, as a rule, at lower prices. Good Red Short Irons, which were held firmly at $38 last week, and $40 the week preceding, sold this week at $35 to $36, showing a decline of $15 to $20 per ton within the past year. Taking this heavy decline in connection with the fact that ore is nearly double what it was at this time last year, while labor and fuel are about the same, it will be perceived that the situation is anything but encouraging for producers. Some of them have shut down, but others are still in blast. They can't afford to shut down; they have their stock to pay for, and they must work it up before they can realize on it. They must have money, and they have come to the conclusion that it is better to have their product shaved than their paper. The mills, in view of the fact that the most of them will stop within the next few weeks, are buying very sparingly, and, beside, no improvement in the demand can reasonably be expected as long as prices continue to decline. Buyers will not commence to stock up until satisfied that the lowest notch has been almost reached; and very often they make a mistake in so doing; the market reacts before they are prepared for it. Quotations may be given as follows: No. 1 Foundry, $43 to $45; No. 2, $40 to $42; Gray Forge, $35 to $38; White and Mottled, $32 to $34; Charcoal Irons, $48 to $55 for Warm, and $60 to $65 for Cold Blast. Blooms also very dull, ranging from $100 to $115, according to quality. The market for finished Irons continues dull, although the mills are all, so far as your correspondent can learn, running, but they, as already stated, will soon shut down, as they nearly always do about the 1st of July. There are still a few orders coming in, but they are mostly small. Jobbers generally are still adhering to the hand-to-mouth policy, carrying very light stocks, in consequence of the unsettled and unsatisfactory condition of the market. Prices remain unchanged; 3 and 8 tenths is the card for Merchant Bars, but 3 and 5 to 3 and 6 tenths are the actual selling rates. Nails are still quotable at $4·50 @ $4·75, cash and time. The Steel mills are still in operation, and trade is fully as good as it usually is at this season of the year. Prices remain unchanged. There is a rather firmer feeling in Window Glass, caused by some of the factories having shut down; but there is no perceptible improvement in the demand, and no change in prices. There is an active demand for White Lead, and our manufacturers report that they are unable to keep up with their orders. Prices are firm but unchanged, 12 cts. for ton lots, and 12½ in a jobbing way. Manufactured Copper continues dull, but an improved demand is anticipated in consequence of the reduced prices.

The Pittsburgh *Commercial*, of June 21, says: The market for Pig Iron has assumed a singular condition the past week—for we find cold short, anthracite and bituminous coal red short, both quoted at same figures, viz: $37, 6 mos. This figure is very low for red short iron, and most makers of that grade are unwilling to sell at that price, and many of the Western furnace men express a determination to cease making rather than do so. We note the following transactions:

BITUMINOUS COAL SMELTED FROM L. S. ORE.

1000 tons gray forge neutral.....	private terms.
400 tons gray forge red short.....	$35 00—6 m.
250 tons gray forge red short.....	36 00—4 m.
150 tons mottled and white.....	32 00—4 m.
100 tons gray forge red short.....	36 00—5 m.
100 tons No. 2 foundry.....	38 00—6 m
50 tons gray forge red short.....	36 00—4 m.
50 tons No. 1 foundry.....	43 00—6 m
40 tons No. 2 foundry.....	40 00—4 m.
20 tons No. 1 foundry.....	44 00—4 m.
10 tons No. 2 foundry.....	40 00—6 m.
10 tons No. 3 neutral.....	36 00—4 m.

ANTHRACITE.

400 tons cold short.....	$35 00—6 m.
400 tons gray forge cold short.....	35 00—4 m.
300 tons gray forge cold short.....	private terms.
100 tons gray neutral.....	$37 00—4 m.
100 tons gray neutral.....	37 50—4 m.
50 tons No. 1 foundry.....	43 00—4 m.
50 tons No. 1 foundry.....	42 00—4 m.
50 tons No. 2 foundry.....	38 00—4 m.
50 tons mottled red short.....	35 00—6 m.
30 tons No. 2 foundry.....	40 00—5 m.
30 tons No. 3 neutral.....	36 00—4 m.
20 tons extra No. 1 foundry.....	48 00—4 m.
10 tons No. 2 foundry.....	39 00—4 m.
150 tons Chickies forge at furnace.....	45 00—cash.
100 tons Chickies foundry at furnace..	44 00—cash.

HANGING ROCK CHARCOAL.

108 tons No. 2 foundry.....	$50 00—6 m.
40 tons No. 1 foundry.....	55 00—4 m.
15 tons No. 1 foundry.....	58 00—4 m.
6 tons No. 1 foundry.....	54 00—cash.

CINCINNATI.

Messrs. ADDY, HULL & CO., under date of June 23, write us as follows: There is no material change to note. The dullness at this season of the year is more manifest than usual. We look for some improvement after the semi-annual balance sheets are closed. Quotations are nominally unchanged.

HOT BLAST CHARCOAL.

Hanging Rock No. 1..	₩ ton..	$52·00 @ 53·00	—4 mos.
" " No. 2.....		48·00 @ 50·00	—4 mos.
" " Forge.....		40·00 @ 41·00	—4 mos.
Tennessee No. 1.....		50·00 @ 51·00	—4 mos.
" Forge.....		40·00 @ 41·00	—4 mos.
Alabama No. 1.....		52·00 @ 53·00	—4 mos.
Missouri No. 1.....		54·00 @ 57·00	—4 mos.
" No. 2.....		50·00 @ 52·00	—4 mos.

HOT BLAST STONE COAL.

Missouri No. 1.....	₩ ton..	$51·00 @ 52·00	—4 mos.
" Forge.....		39·00 @ 40·00	—4 mos
Ohio No. 1.....		45·00 @ 48·00	—4 mos.
" Forge.....		36·00 @ 39·00	—4 mos.
Scotch Pig, No. 1.....			

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel	₩ tn..	$60·00 @ 65·00	—4 mos.
Missouri " "		60·00 @ 62·00	—4 mos.
Kentucky " "		58·00 @ 60·00	—4 mos.
Tennessee " "		58·00 @ 60·00	—4 mos.
Georgia " "		60·00 @ 63·00	—4 mos.
Alabama " "		60·00 @ 63·00	—4 mos.
Machinery and Forge.....		58·00 @ 60·00	—4 mos.
Blooms.....		112·00 @ 115·00	—4 mos.

BOSTON.

JUNE 21.—There is somewhat of a softening tendency in the market for Refined Bar, and sales of American have been made even below our quotations, especially for second-class makes. Many of the holders of best brands of English are not anxious to sell at present rates, as they cannot replace their stocks at anything near ruling retail prices. American Pig Iron is fairly active, and our quotations are somewhat nominal. Scotch is quiet.—*Com. Bulletin.*

SAN FRANCISCO.

JUNE 12.—*Hardware*—Business is improving. We quote Amoskeag Axes, unhandled, $14 to $15; do. handled, $18·50 to $19·50; do. Puget Sound Axes, unhandled, $14·50. Hatchets—Amoskeag, Shingling No. 1, $7·25; No. 2, $8; No. 3, $8·75; do. Claw, No. 1, $7·75; No. 2, $8·50; No. 3, $9·25; Collins' Handled Axes at $17·50 to $20, according to weight. *Metals*—We remark a decided improvement in the jobbing trade of the city. General business is good, entirely satisfactory to the few houses in this branch, carrying as they do at all times immense stocks of assorted goods. At present there is very little demand for Pig Iron, either American or Scotch, and in the absence of imported sales prices entirely nominal—say $50 to $52·50 for the entire range. At the close we note a sale ex ship, of 125 tons Scotch Pig Iron "Glengarnock," at $50. *Nails.*—Imports from January 1st to June 1st: kegs, 42,784. In a former issue we noted the purchase by a leading house of all the Oxford mills here and to arrive for several months to come. We have now to report the purchase by the same firm of all the Boonton mills here and to arrive for 60 days to come—say 15,000 kegs—upon terms withheld. This concentration of the entire product of two leading mill agencies adds great strength to the market. The trade prices remain as heretofore: $5·75 for 10d. to 60d.; 8d. and 9d., 25c. per keg above 10d.; 6d. and 7d., 50c. do. do. 10d.; 4d. and 5d., 75c. do do 10d.; 3d., $1 50 do. do. 10d.; 2d. and 3d., fine, $2·25 do. do. 10

CHICAGO.

JUNE 19.—*Hardware*—Market during the past week has been somewhat quiet, and while standard goods are firm, other descriptions are lower in consequence of cutting in trade. *Iron, Steel and Nails*—Manufacturers' Iron is dull and weak at quotations. Cut Nails are selling at $5 rates and 12½c. off in 100 keg lots. *Pig Iron*—Scotch Pig is weak and selling below cost of importation. American is dull and the mills are without orders. The Steel mills, are, however, running full time without any prospect of letting up. *Tinners' Stock*—The market during the past week has been steady for charcoal qualities of Tin Plate. Roofing qualities are, however, lower at $28 for I C. Charcoal 20x28, and $33 I. X. Charcoal 20 x28. Manufactured Copper is weak at the decline noticed owing to the low dock rates.—*Jour. of Com.*

LOUISVILLE.

Mr. GEO. H. Hull, under date of June 23, writes us as follows: Market dull and weak, the demand being confined to lots for immediate use. The usual time, four months, is allowed on quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$54·00 @	
" 2 " " " "	47·00 @	48·00
" 1 Forge, " " "	40·00 @	41·00
" 1 F'dry, from Tennessee Ores	52·00 @	54·00
" 2 " " "	44·00 @	47·00
" 1 Forge, " "	40·00 @	41·00
" 1 F'dry, from Alabama Ores	54·00 @	55·00
" 1 " " Iron Mountain Ores	54·00 @	55·00

HOT BLAST STONE COAL.

No. 1 F'dry, from Missouri Ores	50·00 @	51·00
" 2 " " " "	45·00 @	46·00
" 1 Forge, " " "	40·00 @	41·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	60·00 @	65·00
" " Tennessee Ores	56·00 @	58·00
" " Alabama Ores	60·00 @	62·00
" " Georgia Ores	60·00 @	62·00
" " Missouri Ores	58·00 @	60·00
" " Kentucky	60·00 @	62·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, corner of South Charles and Lombard streets, report us the following prices, under date of June 24, 1873: Trade has somewhat improved during the past week, but prices are still weak and nominal in character. Stocks are unusually light, and many leading sizes wanting, but dealers prefer this to issuing specifications in the present condition of trade.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick	4·1c. to 4·3c. per lb.
1 to 4½ wide by 1½ to 2 thick	
Round and square, ordinary sizes, from ¾ to 2 inclusive	4·1c. to 4·3c. "
Hoop Iron, 1½ wide and upward	5¾ to 6 c. per lb.
Band Iron, from 1½ to 4 in. wide	5 to 5½c. "
Horse Shoe Iron ¾ to 1 wide by ⅜ to ½ thick	5½ to 5¾c. "
Norway Nail Rods	8c. to 8¼c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	17c. "
Machinery Steel	12c. "
Cast Spring Steel	11c. "
Homogeneous Steel Plate	13c. "
Perkins' Horse Shoes, per keg of 100 lbs	$6·37½
" Mule Shoes " "	7·37½

Common Horse Nails, from 14c. to 18c per pound.

10	9	8	7	6
Putnam Horse Nails..23	24	25	26	28c. per lb.
R. R. Spikes..5½ by 9-16 at 5¼c. per lb.				

FOREIGN.

GREAT BRITAIN.

Messrs. J. Berger Spence & Co., London, Glasgow and Manchester, under date of June 14, 1873, report:

Metals.—A dull feeling pervades this market. Manufacturers and consumers are alike both anxiously waiting the turn of events which may shortly be expected, either in a further reduction of prices by the former, or that the imperative necessities of the latter will compel them to give out specifications and so steady the trade, at any rate, until the shipping season is over. A fair business has been done in Scotch Pig Iron, with little variation in prices. The shipments for the past week were 14,309 tons, against 20,133 tons in the corresponding week of last year. There is not so much inquiry for Middlesborough Pig, and, with a decreased output of May, the stocks in smelters' hands show an increase over those held on the 30th April last; the amount, though only 1321 tons, is of importance, as showing that the supply has for the moment overtaken the demand. The demand for Manufactured Iron is very languid, and although the makers of some of the first-class brands adhere firmly to full list, there are many manufacturers who show an anxiety to compete for orders, and are willing to accept comparatively very low prices to secure the same. Copper is quiet, and values are again reduced. The charters from Chili for the first 14 days in May are cabled as 1900 tons, consisting of 700 tons Bars, and 1200 tons ores and Regulus. In Tin there has been no alteration. For Lead the inquiry is not quite so brisk at present, and slightly lower rates have been accepted. Spelter is weaker, but it is not expected that any great change will take place in its value.

IRON.—"Ayresome" Yorkshire Pig Iron, No. 1, 129/6; No. 2, 124/6; No. 3, 122/; No. 4 (Foundry), 121/; No. 4 (Forge), 121/ net cash, or 2/ extra 4 months' bills. Scotch Pig Warrants, 111/ to 111/6. Staffordshire Bars, £13. 10/ to £16. Hoop Iron, £14 to £16. Gas Tubes, 40 per cent. off new list. Boiler Tubes, 10 per cent. premium.

COPPER.—English Tough Ingot, £94 to £96. Chili Bars, £83 to £85.

TIN.—English Ingot, £135 to £137. Straits, £134 to £135.

TIN PLATES.—Best Coke, I. C., 34/ to 39/; Charcoal, I. C., 42/ to 44/ per box.

LEAD.—Best English Soft Pig, £23. 15/ to £24. Refined Red Lead, £25 to £27.

ANTIMONY.—French Star, £62.

SPELTER.—Silesian, special brands, £26 to £28. English, best brands, £26 to £28.

GERMANY.

(*Borsenhalle.*)

HAMBURG, June 6, 1873.—*Metals.*—*Lead* is firmly held without any transactions of moment on the spot. German, 24⅛ to 25½; English, 25⅛ to 26; Spanish, 26⅛ marks. *Copper* inactive. Northern sorts 97 to 104 marks. *Tin* only sells in a small way, Banca at 1·65, English at 1·60, Rods at 1 62½. In *Spelter* nothing has transpired, and the nominal quotation is 27½.

(*Frankfort Journal.*)

RUHR COUNTRY, June 5, 1873.—A further rapid rise in Coal has taken place, the car load to Holland bringing 20 guilders per load; the cwt. to the Upper Rhine, 42 kreutzers; July and August futures, 44 to 46. Quotations at the mines remarkably firm. Rhine freights, 9d. to 11d. per cwt.

HOLLAND.

(*Koch & Viserboom.*)

ROTTERDAM, June 10, 1873.—*Tin*—The market is dull and little has been done. Banca, auction paying conditions, has been sold at 79¾ guilders, and, in some cases, even at 79½, and to arrive from next fall auction at 80¼. Billiton on the spot has been done at 80 guilders. *Bronze*—Nominally 45 to 47 guilders the 50 kilos.

BELGIUM.

(*Cote Libre.*)

BRUSSELS, June 6, 1873.—At a recent meeting of Iron masters, the causes which have produced the rise in coal were canvassed, and the following opinions exchanged, which we reproduce as probably the correctest views yet given: The enhancement has been suddenly brought about by a resumption of business and of work in Western Europe interrupted by the war of 1870 and 1871. Added thereto came the miners' strikes in England, the high freights from the mines in Western Europe, and the overcrowded railway traffic. Many iron masters getting afraid lest the desired supply should fail them for the carrying out of contracts made precipitately, paid for coal any price asked, going even so far as to leave the coal companies to fix the price afterwards, provided they were served without delay. And as iron rose simultaneously they consoled themselves, in instances in which they had not yet contracted to deliver Wrought Iron, but were possessors of a good supply of Raw Iron at the old low rates, with a high value for their own manufactures in prospect. Coal thus rose to famine prices. In 1872, coal production in Europe has been larger by a couple of million tons than that of any previous year, and it is fair to presume that an adequate supply of the fuel will not be wanting, especially as appearances favor the presumption that activity in manufacturing in general in Europe will be less than what it has been in 1872, nearly every branch having been overdone.

EAST INDIES.

(*Gillanders, Wood & Co.*)

SINGAPORE, May 3, 1873.—*Malacca Tin*—Moderate arrivals have taken place, the bulk of which found buyers at $35¾, which is the closing price. A fair amount of business has been done, and the stock left is but small. The present value of $35¾ per picul is equal to 141/7 per cwt., free on board and freight. The exports of Tin from Singapore to the United States have been the following, during the first four months of the year, in 1873: 12,763 piculs; 1872, 21,788; 1871, 8887; 1870, 15,615; 1869, 10,194; 1868, 8288; and 1867, 6012. Tonnage is scarce, and in but trifling demand; to England, £3. The Crest of the Wave left for Boston with 2117 piculs Tin; the Calcutta for the same destination, previously took 1550, and the Olivia Davis, for New York, 841, all April clearances. The Olive has been chartered for Boston, supposed £3.70 in full. Exchange, 4/5⅝ to 4/5¾, first-class credit bills.

(*Behn, Meyer & Co.*)

SINGAPORE, May 4, 1873.—*Malacca Tin.*—The demand has fallen off, and prices have had a downward tendency; last sales for England and the United States at $35¾ and $35⅝ per picul; there are still about 800 piculs unsold in the market.

(*Aitken, Spence & Co.*)

COLOMBO (Ceylon), May 17, 1873.—*Plumbago* remains without material change, and shipments are going forward, both for the United States and London. The Chanticleer, for New York, has nearly completed her loading, and will probably sail early in the ensuing week, with about 420 tons. The Loch Awe and Lemnos remain as last advised. The Dunloe, 311 tons register, is reported as fixed to load for Philadelphia. Plumbago exports from Colombo and Galle to the United States during the season commencing Oct. 1, 1872, up to date, 68,693 cwts., against 26,342 cwts. the previous season. Total Plumbago export to all countries thus far 94,793 cwts. We quote, cost, free on board, with commission and exchange at par: Lump, cleaned, including packages, per ton, 540/ to 577/6; Chip, 250/ to 273/; Dust, 140/ to 157/6; Freight to New York, 75/. Exchange, private, 1⅛ to 2 per cent. premium for credits.

WEST INDIES.

(*J. N. Harriman & Co.*)

PORT OF SPAIN (Trinidad), June 7, 1873.—*Iron Hoops* are steady at $4 the 100 pounds; duty, 5 per cent. *ad valorem;* wharfage dues, 2c. per bundle. *Fire Bricks*—In good demand at $25 to $28 per 1000; common Red and Gray, $20; duty, 24c. per 1000; wharfage, 48c., all 3 months' credit. The demand for all cooperage materials is at an end, crop being closed.

CHINA.

(*Olyphant & Co.*)

HONG KONG, May 9, 1873.—*Nail Rod*—English Bar and Hoop *Iron* are all lower in value, and Wire is slow of sale, although the supply is small. *Steel* and *Tin Plates* cannot be placed at former figures; but *Lead* is dearer, and sales are being made at an advance of 15 to 20c. per picul. *Quicksilver* is quoted at $3 per picul higher, but holders are asking a still greater advance. The arrivals of *Coals* have been 3148 tons, comprising 2828 tons of Australian and 320 tons of Keelung. There have been no sales, and Australian has been offered at lower prices, as the supply on the way is ample. Cardiff is held for former prices. *American Anthracite Coal* is firm at $12 to $13 per ton.

JAPAN.

(*Charles Thorel & Co.*)

YOKOHAMA, May 21, 1873.—In Metals there has been an improved demand for *Nail Rod Iron*, and *Pig Iron* also has been inquired for. Deliveries during the fortnight, 2289 piculs of all kinds; stock, 9055 piculs. Stock of Steel, 425 piculs, and of Lead, 339. Closing quotations flat and round *Iron*, $4¼ to $5 per picul; *Nail Rod*, $4¼ to $5·35; *Pig*, $2·05; *Wire*, nominally, $11 to $12; *Steel*, nominal; *Lead*, $5½ to $6. Exchange on London, 6 months' bank, 4/5½; on New York, 30 days' sight, private bills, 107½.

SOUTH AMERICA.

(*Sandbach, Parker & Co.*)

GEORGETOWN (Demarara), June 7, 1873.—*Iron Hoops* are well sustained at 4¼c. per pound; duty, 10c. the cwt. Import thus far, 1873, 2702 cwts.; total import in 1872, 9920 cwts. *Coal*—Import thus far, 1873, 5485 hogsheads and 25,676 tons; total import in 1872, 22,718 hogsheads and 57,298 tons. *Exchange*—Ninety days' bank, $4·80 to the pound sterling.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending June 24, 1873:

Hardware.

Amson L. & Co.
Cases, 7
Boker Hermann & Co.
Cases, 6
Beam & Murray,
Per. caps, cases, 4
Demuthe Wm. & Co.
Cases, 3
Field A. & Co.
Mdse. pkgs., 5
Flues & Co.
Cases, 7
Hilger E. & Sons,
Cases, 4
Harmar, Hayes & Co.
Mdse. pkgs., 1
Justice P. S.
Mdse. pkgs., 2
Lau & Garliche,
Mdse. pkgs., 21
Cutlery, casks, 1
Many F. L. & Marshall,
Mdse. pkgs., 3
Mason John W. & Co.
Wire rope, coils, 4
Oelrichs & Co.
Arms, cs., 1
Robbins C. & Son,
Mdse. pkgs., 2
Rosenthal J. & Co.
Cases, 6
Schoverling & Daly,
Mdse. pkgs., 7
Struller Louis,
Cases, 5
Schweitzer Mfg. Co.
Mdse. pkgs., 2
Spies, Kissam & Co.
Mdse. pkgs., 1
Van Wart & McCoy,
Mdse. pkgs., 2
Van Nest A. R. & Co.
Cases, 2
Order.
Packages, 29
Cases, 6
Casks, 1

Iron.

Abeel Bros.
Bars, 2700
Bussing, Crocker & Co.
Pig, tons, 330
Bruce & Cook,
Sheet, bdls., 162
Congreve Chas. & Son,
Rails, 1092
Fish plates, bdls., 31
Griswold J. A. & Co.
Pig, tons, 155
Holdane, Hopkins & Stokes,
Bars, 2315
Hoop, bdls., 400
Henderson Bros.
Pig, tons, 340
Lang W. Bailey & Co.
Mdse. pkgs., 70
Fish plates, bdls, 1560
Rails, 246
Lamarche H.
Sheet, cs., 36
Plates, cs., 10
Milliken S. Jr.,
Rods, bdls., 101
Prosser Thos. & Son,
Tire forgings, 132
Page E. & Co.
Bars, 1599
Phelps, Dodge & Co.
Sheet, bdls., 160
Smith G. G. & Co.
Scroll, bdls., 161
Bar, bdls., 127
Bars, 550
Smith G. A. & Co.
Old rails, pcs., 3331
Willston, Knight & Co.
Boxes, 157
Wiebusch F.
Kegs, 20
Whitney A. R.
Bars, 417
Flues, 805
Order
Spiegel, tons, 136; lots, 1
Scroll, bdls., 170
Bar, bdls., 78
Rails, 1151
R. R. bars, 11,794
Scrap, tons, 568
Pig, tons, 251

Steel.

Drexel, Morgan & Co.
Rails, 840
Frith Edward,
Mdse. pkgs., 1
Lang W. Bailey & Co.
Blooms, 88
Moore Henry,
Cases, 22
Naylor & Co.
Rails, 834
Perkins, Livingston & Post,
Bessemer rails, 377
Seligman J. & W.
Bessemer rails, 823
Rails, 1210
Van Wart & McCoy,
Bundles, 696
Order.
Rails, 2642
Without bills of lading.
Bundles, 197
Cases, 5

Metals.

Barnard Geo. M.
Lead, pigs, 800
Bruce & Cook,
Tin plates, bxs., 265
Berschmann J.
Tin plates, bxs., 777
Tin ingots, 340
Bar tin, bbls., 15
Bank of British North America,
Tin, slabs, 549
Brown Bros. & Co.
Tin, slabs, 459
Dickerson J. S. & Co.
Antimony, cks., 33
Hoxton M. B.
Lead, pigs, 2000
Hart Lucius & Co.
Tin ingots, 300
Lyles & Gibson,
Scrap, copper, hhds., 1
Copper, sheets, 1
Lamarche H.
Zinc, bbls., 115
Moller & Theband,
Scrap, copper, pkgs., 6
Phelps Dodge & Co.
Tin plates, bxs., 2046
Lam. zinc, cks., 130
Order.
Tin, blocks, 580; slabs 200
Spelter, pcs., 3522
Lead, pigs, 2948.
Tin plates, bxs., 1988
Copper, pkgs., 1406
Antimony, cks., 83
Without bills of lading.
Tin plates, bxs., 1932

Our English Letter.

Review of the British Iron, Hardware, and Metal Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, Eng., June 9, 1873.

The Bank of England has again raised its rate of discount, making it seven per cent. This is a somewhat serious matter at this particular season of the year, and will have considerable effect on the iron trade and its collateral industries, inasmuch as dear money always implies very limited speculation, and consequently less pressure on makers. It is of a more than ordinarily serious nature just now, seeing that since the year 1844, when the Bank Charter Act was passed, the rate has only twice been increased in the month of June. The first time was in 1853, when the Crimean war was impending, which occasioned a heavy foreign demand for gold. The present advance would appear to be caused by a similar Continental demand, somewhat aided by considerable consols settlements on the exchanges, and the usual monthly amounts for bills. The home requirements may reasonably be expected to adjust themselves in a day or two, but the foreign pressure will hardly be so readily disposed of. Of late years an extraordinary number of exchange firms and Continental or other banks, with extensive connections throughout Europe, America, etc., have established themselves in London, which city they make the center of their operations. The majority of these have taken a part, more or less extensive, according to their respective capacities, in the French loan and other large transactions. The monetary panic in Vienna, Berlin and other German cities, has rendered a supply of cash absolutely necessary, which has been obtained by simply discounting bills in London. The gold so obtained has been exported, hence it is thought quite necessary that the bank should advance its rate for self-protection. But *de facto*, as I have just said, we are punishing our own trade in the endeavor to keep the banks' reserve up to a certain percentage of its issue, and when trade is good and the whole country prosperous, there really appears to be no valid reason why money should be 7 per cent. It is but a poor argument to advance, as the London *Times* did the other day, that panics were useful in clearing away over speculative houses, which "improperly undersell the more prudent and wealthy trader." Unfortunately panics always do more than that: they inflict ruin and misery on thousands of innocent people who know nothing at all of speculation. What we want is an extension of the bank powers, a discretionary extension of the circulation in times of extreme pressure. Some day or other, I dare say, we shall obtain that concession. On Whitmonday, last week, the trades' unionists of London had the largest public procession and demonstration that has ever been witnessed in the metropolis. Its chief object was stated to be to protest against the Criminal Law Amendment Act, and (as stated in the published programme), "other class-made laws which favor employers and punish workmen." The procession started soon after noon from the Thames embankment, and extended more than a mile in length. By the time Hyde Park was reached—some distance I may say—it is computed not less than 30,000 people, processionists and others, were present, so that an imposing spectacle presented itself. The whole affair was very well organized, the line being composed of nine sections each, under the control and direction of its marshal and superintendent, with banners flying and brass bands "discoursing sweet (?) music!" When Hyde Park was reached they were separated into different bodies, which were assigned positions contiguous to a number of platforms. Deputations were present from the Birmingham and Sheffield trades unions, the speakers being Mr. George Odger (who is, by-the-by, in the Court of Bankruptcy for costs incurred by him in a losing action against the *Figaro* newspaper) and other leading trades unionists. The whole thing went off in an orderly manner, which appears to have greatly astonished our metropolitan journalists, some of whom seem to think that the workingman is a being of marvelously pugnacious and quarrelsome disposition. The London people are not accustomed, as we in Sheffield are, to trades union demonstrations, or they would hardly be surprised at anything. As for the number of people that was simply insignificant, as compared with the gathering of 100,000 scholars and spectators we had at Sheffield on the same day, which passed over without the slightest hitch. The labor market is disturbed here and there, but I have no serious disruption to record this week. At Sheffield the engineers threaten a strike unless an advance of 2/ per week and some revision of overtime pay be conceded. In the London building trade another great strike is imminent. The stone masons say that a promised advance of one penny per hour has not been granted, the employers proposing to postpone it until March, 1874, and further, that when the rise is given an extra hour shall be worked on the Saturday. The men declare vehemently that they will by no means agree to this, in which they are seconded by the carpenters and joiners. A great meeting is shortly to be held on the subject in the St. James' or Exeter Hall. On the Great Western Railway line the plate layers have struck. A part of them, north of Wolverhampton, will resume work to-morrow, but south of Wolverhampton to Birmingham and Kidderminster they remain out, and great public inconvenience is likely to be caused. In Dean Forest (Gloucestershire and Worcestershire) one of the leading iron firms has paid off the miners in its employ, the alleged cause being "depression of trade." On Thursday last one of the most singular—so singular and striking as to be almost pathetic—spectacles that modern times have seen, was presented at Wentworth House, near Sheffield, the stately residence of Earl Fitzwilliam. The earl's colliers have lately been very troublesome, and they have endeavored to drive out a miner who would not join the trade union. On behalf of this man the earl interfered, and has shut up the pit. The men thereupon apologized and, at the invitation of his lordship, attended *en masse* (about 300 of them) at the house to hear how he would receive their apology. His lordship addressed them at great length, pointed out how great a crime they were guilty of, spoke of his determination not to let any man in his employ be ill-treated, expressed his great sorrow at their conduct, and announced that he would take the question of reopening the pit into consideration. They were afterward entertained at dinner in the pillared hall of the house. Can any man imagine any greater contrast than this?—any more forcible illustration of the progress of civilization? On the one hand you have the grim, sooty miners banded together and led by the trade union leaders, faithful to nothing but that which appears to them to bring in most bread and cheese and beer, with a plentiful sprinkling of holidays; while on the other you have the stately presence of the noble Earl Fitzwilliam, Knight of the Garter, a principal peer of the realm, a descendant of innumerable Fitzwilliams, one of the largest land owners in the kingdom, and chief mine owner in the locality, who, overcoming his natural reluctance to speaking in public, stands upon the steps of his ancestral staircase and speaks, half paternally, half angrily, to his workmen. He appeals to their memories. "Who ever knew of an accident in my collieries? No one. Who have always been most thoughtful for our men and most anxious for their—for your—welfare? We have—I and my ancestors. I have seen with regret how you have been taught to believe my interests and yours to be antagonistic;" and so on in the same strain. He would, if he liked, close his collieries; they would always be a good bank for himself and his successors, it needed. He talked to them an hour or more, but—mark the sequel—the good old blue blood of the Wentworths would not let him send them away dinnerless. *They* might do wrong, but the Fitzwilliam would not, at least, forget what was due from him according to the traditions of his noble house. At Wentworth House a horn of beer is ever ready for the stranger, no matter whom he may be—a remnant of the "good old times." There is a certain smack of the Sir Leicester Dedlock infallibility in all this, but despite that one can hardly help admiring the sense of duty, the innate nobility, and the conscious pride of the patrician ancestry, shown by the act—an act requiring considerable moral courage.

In the iron trade generally there was little or nothing doing during the whole of last week, owing to the Whitsuntide holidays. In Scotland warrants are quiet at 115/ to 115/6, and makers' prices are: Gartsherrie No. 1, 130/; No. 3, 115/; Coltness No. 1, 131/; No. 3, 117/6; Summerlee No. 1, 130/; No. 3, 115/6; Carnbroe No. 1, 125/; No. 3, 115/6; Monkland No. 1, 121/; No. 3, 115/; Clyde No. 1, 121/; No. 3, 115/; Govan No. 1, 115/; No. 3, 114/; Langloan No. 1, 130/; No. 3, 117/6; Calder No. 1, 130/; No. 3, 115/; Glengarnock No. 1, 122/6; No. 3, 116/; Eglinton No. 1, 115/; No. 3, 113/; Dalmellington No. 1, 116/; No. 3, 114/; Carron No. 1, 130/; Shotts No. 1, 130/; No. 3, 118/6; Kinnell No. 1, 125/; No. 3, 117/. You will notice that some of these are reduced by tully 5/ per ton. As compared with last year, shipments from Scotch ports show a diminution of no less than 108,000 tons. Stocks in Connal's stores are 58,000 tons, with warrants in circulation for 45,000 tons. In Cleveland there is little or no alteration. At Sheffield the founders and engineering firms, most of whom resume work on Thursday morning, are still unusually busy, many of them being utterly and entirely unable to cope with the demands made upon their producing powers. The orders for colliery winding, pumping, and other similar engines, are unusually numerous and heavy, many of them being for use among the various new pits which are being sunk in the South Yorkshire district. One of the principal engineering companies is now constructing a "squeezer" on a powerful scale, as well as other machinery, for a Danks puddling apparatus, to be used at a large establishment.

The commissions to hand for general foundry work, engine, mill and colliery castings, are still on a liberal scale, heavy prices being exacted for early delivery. The locomotive works are fairly busy on tank, goods and passenger engines for English and foreign lines, there being, in addition, a good inquiry for Perkins' and other engines. In the steel trade matters are in much the same condition as when last reported upon, the leading houses being full of work. An alteration in the mode of engaging the melters and furnacemen is being mutually arranged between masters and men. The file trade continues very brisk in the majority of cases, an amicable settlement having been made with the file grinders, by which they have received an almost general advance of 10 per cent., the employers agreeing to waive the charges proposed to be made for the use of tools. One firm sends off 30 tons per week.

The cutlery industries are but moderately active, with some two or three important exceptions. Hitherto the American inquiries have been below the average, but advices from New York were last week received which lead to the belief that an improvement may shortly be expected, although not on any large scale.

The strike of razor scale pressers has not yet been settled, but, as stocks are getting low, overtures are being made with a view to an early compromise, which has in some cases been effected.

At Birmingham the holidays last week caused a complete stagnation of business. I extract the following review of the past month's metal trade from Rogers, Sons & Co.'s circular, dated June 6:

COPPER.—We have had a strong reaction from the sharp fall named on the 30th of May, the statistical position of copper not being found so unfavorable as had been anticipated when the charters for the second half of April were telegraphed. The actual figures when analyzed seem to be as follows: Charters for four months, 1873, 15,206 tons; charters for four months, 1872, 17,300 tons—a decrease of 2100 tons in four months, at which rate the year's supply from Chili would be under 40,000 tons. It is a matter worth observation that more copper is coming from Chili, in the shape of ore and regulus, than has been usual of late. This probably arises from the increased cost of fuel and labor, and which did not probably have its full effect last year.

Another point that should be noticed, and which we alluded to in our last monthly report, is the continued decrease in our imports compared with 1872, and the very large augmentation in exports. The figures will be found below, but inasmuch as the imports have diminished 5101 tons, and exports increased 6115 tons in the past four months, it shows an actual displacement of over 11,000 tons of copper. Unfortunately, however, these large items have not yet affected our actual stocks to the extent that would have been supposed, still the available quantity of copper is less at the moment than it has been at any period since August, 1872. The market, however, is most sensitive, and becomes immediately depressed upon any anxiety being manifested by holders to realize any quantity, whilst, on the other hand, a very shall demand for cash almost as quickly determines sellers to advance their quotations.

The sales in the past month were 4480 tons Chili, at from £92 to £81; and 2640 tons Australian, from £96 to £89. Up to Wednesday morning last prices had recovered quite the £5 fall that had been experienced; but since the advance of the bank rate to 7 per cent. the market has a decidedly weak tone, but with small quantities offering.

The imports of copper into England for the first four months of the following years were:

1870	1871	1872	1873
17,643	23,673	27,007	21,906 tons.

The exports for the same periods were:

19,991	11,941	12,376	18,491 tons.

The position from June 1, 1872, to June 1, 1873, was as follows:

	Price.	Stock on hand. Tons.	Stock incl'g aff't & ch'td Tons.
June 1, 1872	£107	21,595	35,495
July 1, 1872	104	23,213	37,447
August 1, 1872	103	27,733	39,733
September 1, 1872	90	27,922	39,989
October 1, 1872	84	29,342	41,409
November 1, 1872	86	28,940	40,051
December 1, 1872	85	30,753	40,453
January 1, 1873	90	32,601	41,591
February 1, 1873	87	32,443	42,012
March 1, 1873	85	32,180	41,663
April 1, 1873	92	30,796	39,375
May 1, 1873	88	29,908	39,024
June 1, 1873	84	30,914	38,984

And the comparative positions at the same date of the past four years, with the present:

	Price.	Stock on hand. Tons.	Stock incl'g aff't & ch'td Tons.
June 1, 1869	£67	24,063	44,896
June 1, 1870	68	30,234	43,283
June 1, 1871	65	34,117	43,677
June 1, 1872	107	21,595	35,495
June 1, 1873	84	30,912	38,984

TIN.—This metal had a drooping tendency throughout May, and fell altogether £5. Since the announcement that the two sales in Holland in September and December would each consist of only 30,000 slabs Banca, the market had a steadier tone, but prices only fractionally advanced, and have since receded again.

SPELTER.—The demand is most slack; prices on the Continent are maintained as high as ever, but there has been considerable underselling of spot parcels, and English is much more freely offered. The stocks are: London, 647 tons; Hull, 500 tons; Grimsby, 410 tons.

LEAD.—The demand is hardly so good, but short supplies of foreign keep up prices.

Vienna Exposition Notes.

VIENNA, May 29, 1873.—The exhibition is now making good headway, and on Ascension day and last Sunday the number of visitors exceeded 30,000. The American and South American departments are the only ones not yet thrown open to the public. The English is finished, that of France progressing rapidly, Switzerland, Portugal, Belgium and Holland have theirs completed; the Spanish department is getting ready, as well as that of Italy. The German exhibition is farthest advanced, and Austria and Hungary will be in all their splendor within a week from now. The Russians are making great exertions to have theirs in readiness for the Czar's arrival. One of the most attractive is the Greek display. Turkey already shows the pavilion for the Sultan's treasures. China, Persia and Roumania, with their dazzling oriental productions, draw multitudes of spectators, and Japan and Egypt rival them with dignity. To the art galleries all Europe contributes its products of combined genius and talent. The machinery halls are backward as yet, except those of England and Switzerland. The Turkish coffee divan has been opened, as well as the Japanese garden, with crowds of people in the restaurants and pavilions. But although the Vienna Exhibition will be of extraordinary beauty, it has encountered a deal of mishap at first. The weather has been abominable. During the whole month of May we have had but five days of sunshine—rain, cold, high winds, and even snow, alternating during the rest. Not only was the Prater shorn of animation, but apprehensions for the crops are entertained. Add to it the terrible crisis on 'Change, and you have a dark tint cast over a picture intended to be all sunshine, with thousands of families ruined by speculation. But 600 foreign visitors arrive daily at Vienna. This is less than the number arriving here in May every day in ordinary seasons. The exorbitant prices asked had caused many people to stay at home; but the hotel keepers now begin to open their eyes, and fares are rapidly declining all over the city. In the hotels 4000 rooms are empty, and a decent lodging can now be had at the rate of $2 per diem. Not 200 persons are boarded to-day at the monster barracks for lodging artisans. But all this will undergo a change after a while; the temptation to visit Vienna is too great. Especially will this be the case by the time the Shah of Persia will return from his Western trip. The gambling establishments having been closed on the Rhine and Ems, people who were in the habit of resorting to those watering places for pleasure will, in July, all flock hitherward.

The Statue of Arminius.

The Hanoverian *Journal*, of June 7th, says: The statue of Arminius, or Hermann, the liberator of Germany from Roman servitude, will now soon be finished. The statue will within five or six weeks have arrived in all its parts at the Grotenburg, near Detmold. In hight, up to the uplifted sword point, the statue itself will measure 90 feet, and the entire monument 183 feet. In weight the statue represents 2000 cwts. of copper, and its erection alone will cost 50,000 thalers. The upper gallery of the pedestal, 154 feet in circumference, will conveniently hold 300 persons, its width being 4 feet. The lower foundation upon which the monument rests measures 15 feet in hight above the surface; portions of the wreath which adorns the pedestal will be furnished with inscriptions, one of which, and the principal one, has given rise to a good deal of unpleasantness and ridicule. The monumental managers offered a reward for the production of the best Latin phrase, and the prize has been awarded to a professor in Italy. That the united press of Germany would be down upon the committee in charge of this little affair was to be supposed, and this is now coming to pass, much to the annoyance of these worthies.

The Hartford Steam Boiler Inspection and Insurance Company make the following report of its inspections in the month of May 1873. During the month 1044 visits of inspection were made and 2165 boilers examined—2024 externally and 910 internally. 210 were tested by hydraulic pressure. The number of defects discovered in all 973, of which 210 were regarded as dangerous. The defects in detail were as follows, viz: Furnaces in bad condition, 38—4 dangerous. Fractured plates, 68—37 dangerous. Burned plates, 51—14 dangerous. Blistered plates, 174—32 dangerous. Deposit of sediment, 161—18 dangerous. Incrustation and scale, 141—19 dangerous. External corrosion, 63—13 dangerous. Internal corrosion, 28—13 dangerous. Internal grooving, 33—4 dangerous. Water gauges defective, 28—4 dangerous. Blow-out defective, 12—4 dangerous. Safety valves overloaded, 21—16 dangerous. Pressure gauges defective, 167—13 dangerous. Boiler without gauges, 1—dangerous. Deficiency of water, 11—6 dangerous. Braces and stays broken, 46—14 dangerous. Boilers condemned as unsafe to use, 10. Mud drum condemned, 1.

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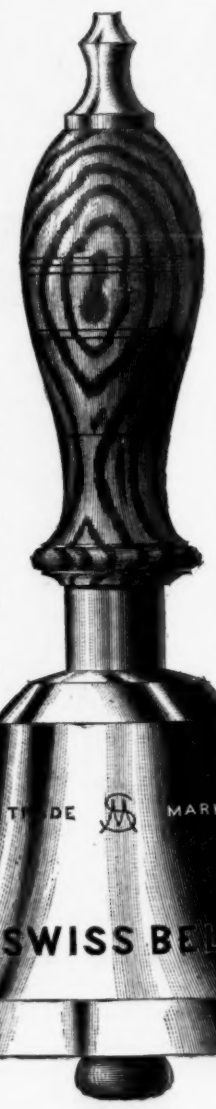

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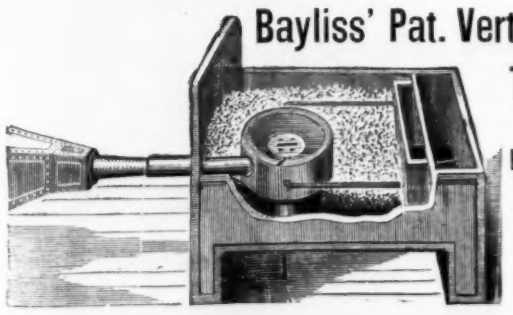

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The New Era of Southern Manufactures.

BY GOVERNOR PATTON, OF ALABAMA.

In former times it was very difficult, in fact, it was impossible, to secure for the question of building up manufacturing establishments in the cotton growing States that careful and dispassionate consideration which its importance demanded. Planters engaged in the cultivation of cotton were content with the income derived from their plantations. They would not readily yield to suggestions or arguments in favor of diverting even a moderate portion of capital employed in producing the great Southern staple to the business of converting it into fabrics. The consequence was that the vast wealth of the cotton-growing region was devoted almost exclusively to a single pursuit. But that pursuit was eminently successful and prosperous. The returns received by the planters for the sale of their cotton were sufficient to gratify any reasonable wish. In 1860, Alabama produced well nigh 1,000,000 of bales, being nearly one-fourth of the entire American crop. This cotton, at a moderate calculation, at the then market rates, was worth $50,000,000. With such an immense profit from a single pursuit, it is not to be wondered at that those engaged in it should hesitate in reference to schemes and enterprises which looked to diversity of their capital and labor. Contented people are not usually disposed to encourage innovations, especially when the contentment rests upon such an apparently substantial basis as that of cotton planting before the war. Still sagacious and thoughtful political economists could plainly see that it was lamentably unwise to concentrate so much capital, labor and energy upon a single object. Such a policy on the part of capitalists neglected those vast and varied resources which we possess, and which, if properly developed, will build us up, as a people, to the proportion of substantial greatness, and insure us permanent prosperity.

In the present condition of the country a diversity of pursuits is a matter of prime necessity with us. A radical change has been wrought in our labor system. That organized and systematic plan of plantation labor, under which Alabama was enabled to furnish 1,000,000 bales of cotton, is completely broken up. The negroes, in their new condition of freedom, are doing quite as well as could be reasonably expected under the circumstances. Yet, in view of the derangement necessarily resulting from their sudden emancipation, we may not calculate upon raising so much cotton as was produced before the war. The negroes have been suddenly thrown into a new condition. They are no longer subject to the guiding care of the white man, and hence it would be unreasonable to suppose that their labor would be as available as in former times. Though the negro is no longer subject to our control, yet we should encourage him in every proper way to devote himself industriously to the cultivation of lands. For this he is peculiarly fitted. Land owners are dependent upon him for the labor which is necessary to produce cotton. He has, therefore, but to avail himself of the advantages which he thus possesses, to make for himself an independent living, and become useful to the community. Our constitution and laws, as modified since the war closed, give full protection to the negroes in their personal rights; and I have no doubt that those who formerly owned them, who raised them and cared for them all their lives, will continue their friends and do them full justice. But, however hopeful we may be in this respect, we cannot close our eyes to the serious derangement which the late unfortunate war has produced in regard to negro labor.

Much has been said about inviting immigration to our State, to supply the deficiency occasioned by the diminution of black labor. In the course of time this experiment may be successful to a limited extent, at least, but for the present we should not depend too much upon it. In fact, it yet remains to be demonstrated that white labor can be successfully applied to the cultivation of cotton. At any rate, experience has shown that even if it could be so used with partial success, it is by no means so well adapted to it as the labor of the blacks. Nature has endowed the negro with a physical constitution which is peculiarly fitted for labor and toil in a tropical sun.

From this, however, it should not be inferred that immigration is a thing to be discouraged. Far from it. We have ample field for the employment of all industrious classes who may be desirous of identifying themselves with our interest and destiny. Let them come, not only from Europe, but from the more densely populated States of our Union. We need labor, especially that kind which may be adapted to the production of cereals, to internal improvements, and to the development of our mineral and manufacturing resources.

The only criterion by which to determine the importance and prosperity of any country is the amount and value of its exports over its imports. No State or community can prosper unless its exports exceed its imports. That rule which political economy applies to individuals or families upon this particular point, is equally applicable to States. Every one knows that it matters not what a man's labor is worth, or how much he may make by it; if he consumes his income by profligate or extravagant expenditures he will never grow rich. But the man who regularly saves a portion of his income, however small that income may be, will always be independent, and may become wealthy. It is far more easy to make money than to save it. If Alabama, from her agricultural pursuits, make $25,000,000, and her people deem it necessary to expend that income abroad, it is plain and palpable that the State would not advance in prosperity. But if by the manufacture of cotton and by other possible means, she can double and quadruple the value of our exports, or spend less away from home, we may more than regain the power and influence which we have lost. We should think less of traveling in the North and elsewhere. We should think less of sending our children away from home to be educated. There should be less Southern money spent at Cape May and Saratoga. The millions expended in Northern pleasure excursions go to enrich those from whom we never received a shilling, except in exchange for our raw cotton, which is manufactured and made to increase the moneyed influence and power of New England. We have, heretofore, been too much dependent on the North for manufactured articles. This unwise dependence is not confined to cotton goods. It extends to everything from children's toys and rat-traps to a locomotive. A thoughtful man will find much food for reflection by stepping into the stores of this or any other city. There he will find a well-assorted stock of ax-handles, brooms, tubs, baskets, hats, shoes, boots, saddles, harness, cutlery, &c., all of which are manufactured North, but every article of which can and ought to be made in the South.

We must turn our attention to manufacturing. The product of the soil of Alabama will not now, as formerly, sustain that liberal expenditure, and I may say, extravagance in living, to which our good people have been accustomed. It is my earnest desire that Alabama shall be self-sustaining. Let us make all that is needed for home purposes and as much as we can to send abroad. Let us have our own literary institutions for the education of our sons and daughters; and by such means increase the excess of our exports over our imports. We will yet become prosperous, independent and rich, if we only adhere to the plain and simple rules of economy, which experience has established for our guidance.

It may be stated as a general proposition, and at the same time a simple one, that upon an average one yard of cotton goods is worth as much as one pound of the raw material. The number of yards produced from a single pound depends, of course, upon the quality of the manufactured article. For instance, from one pound of cotton you may make four yards of what is known in mercantile parlance as four-quarter brown muslin. These four yards would be worth 80 cents; and thus we see that the process of manufacturing has added 60 cents to the value of one pound of cotton. Taking this quality of goods as a basis for a calculation, we can plainly see how the value of a given amount of the raw material may be increased in value, until, in the finer article, a simple pound may be made to yield several dollars. But we may find ample inducements for manufacturing enterprises, by referring to the plainest and simplest articles that can be made. We double the value of cotton by converting it into yarns or common osnaburg. Hence, we may take our 250,000 bales, worth $25,000,000, and if we manufacture nothing but the most ordinary articles, we may increase its value to $50,000,000; that is as much as we realized from our former crop of 1,000,000 bales.

A little close examination will show that prof its arising from manufacturing cotton are far greater than those derived from producing the raw material. Let us take for example a few figures in reference to cotton factories at Lowell, Massachusetts. There are at Lowell 10 large manufacturing establishments, all of which are chartered corporations. The aggregate capital invested in 10 mills is $13,000,000. The amount of cotton consumed is 100,000 bales, and the number of yards produced, exclusive of yarns, something over 100,000,000, and the number of operatives 12,000. The operatives are mostly women and girls. It would require at least 30,000 field laborers to raise this cotton, and yet it is converted into yarns and cloths by 12,000 operatives. The process for manufacturing the cotton, as we have seen, will double its value, even if nothing but the plainest and commonest articles be made; and yet the process requires the labor of only 12,000 women and girls; whereas, it requires 30,000 hands in the field to furnish the raw material.

These are plain and positive figures taken from sources of undoubted realiability. It will be seen at once that the dividends paid upon these Lowell mills, must be highly remunerative.

Statistics such as these tell their own story. They are safe and unerring guides to all who may seek to ascertain the profits of manufacturing, and surely they afford ample encouragement for Southern enterprises of this character.

In the business of manufacturing cotton the South possesses many and very great natural advantages over the North. Among these we may reckon as not inconsiderable the vast difference in climate. Lowell is situated in latitude 42½° north. The climate there is very cold; in mid-winter the mills are seriously interferred with by freezes. In six or eight months of the year it is indispensably necessary, by artificial means, to raise the temperature of the atmosphere in order that the spindles and looms may run successfully. The furnaces and fuel required to produce this artificial heat, form, in the aggregate, no inconsiderable item of expense. From all this, we, in this climate are entirely free. Further than this, there is a material per centum in our favor, in the comparative operation of the atmosphere of the two climates upon machinery and upon cotton, from its raw state, through the various processes to which it is subjected in manufacturing. This particular point is discussed at some length in a communication which I have recently received from a highly intelligent gentleman, to whose opinions and views upon the general question of manufacturing I attach a very high importance. This writer claims that the climate's advantage in our favor is fully equal to half a cent in the yard of fabrics. At that rate the aggregate difference upon the goods produced from Alabama's estimated crop would be over a $1,000,000.

Alabama and Georgia are situated within 30° to 35° of north latitude. Their northern boundary is therefore 7½° south of Lowell. Here we can work any kind of machinery, at all seasons of the year, without having to resort to artificial heat.

We have another great advantage in the motive power for driving machinery. If, in any particular locality, steam should be preferred for his purposes, we refer to our inexhaustible coal fields and extensive forests as advantages which are worthy of consideration. It is not probable, however, that steam will be much used for factory purposes, if, indeed, it is used at all. We have all the water-power that could be desired in nearly every part of the State. It can be had almost without price. The Chattahoochee, which divides Alabama and Georgia, and upon which your establishments are situated, afford the very first advantages. From West Point to Columbus, a distance of some 35 miles, there is almost a continual ripple of shoals and waterfalls. Between these two points there are eligible mill sites to any desirable number. Then there is the Tallapoosa, upon which is situated the Tallassee factory, owned by Barnett, Micou & Co. This establishment is now in prosperous operation. It yields a handsome dividend to its enterprising proprietors, and gives profitable employment to hundreds of needy laborers. Again, we have the Coosa and Warrior rivers, with their various tributaries, sweeping for long distances through the beautiful valleys and rich mineral districts of the State. These streams, at almost any point, are readily available for purposes of running factories. Favorable points upon them may be obtained at little or no cost.

In this connection reference may very properly be made to the Muscle Shoals, in the Tennessee, and some of the streams which empty into that river in North Alabama. Some years ago the general government made a donation of 400,000 acres of land to aid in the construction of a canal around the Muscle Shoal, a distance of 20 miles.

The canal was cut, and upon it were constructed 18 substantial locks. The locks were built of fine white and well-dressed limestone. From a deficiency of funds, however, the canal was never put in a condition to answer the purpose for which it was intended; hence, the enterprise was not a success; but in its present condition it possesses unrivaled advantages for manufacturing establishments. These great advantages will doubtless be turned to practical account at no distant day by enterprising capitalists.

Flint River has fine water for mill purposes. Bell factory is situated upon this river, 10 miles from Huntsville. It is one of the oldest establishments in the State, having been built by Patton, Donegan & Co. The factory has always been prosperous. Before the war it was operated entirely by slave labor. Perhaps as great a variety of goods was turned out at that factory as at any other in the country, North or South. Ticking, osnabergs, cottonades, sheetings, domestics, striped and checked muslins, and every variety of yarns, cords, etc., were extensively and profitably made at that establishment. It is gratifying to know that since the war its operations have been enlarged. It is now run by white labor.

Many years ago an extensive establishment known as "Cypress Factory" was built on Cypress Creek, near Florence. It was conducted with signal success by Martin, Weakly & Co. At a later period Lauderdale Factory was erected on Shoal Creek, by Baugh, Kennedy & Co. These establishments were burnt during the war. Before they were destroyed, however, they enriched their worthy and enterprising proprietors. These gentlemen are not only in easy circumstances, but they are gratefully remembered as public benefactors, in having furnished remunerative employment to hundreds of needy laborers, many of whom might otherwise have been idle and even helpless sufferers in the community. I will also mention my friend, Daniel Pratt, of Prattville, Autauga county, who has done so much in behalf of manufacturing enterprises. He has pursued the business with zeal and activity for more than a quarter of a century. I trust the gentlemen mentioned will pardon me for the liberty I have taken with their names. As successful manufacturers they have made themselves prominent. They may be very properly pointed out as examples worthy of imitation.

Our immense advantages in this regard are perfectly plain. They are patent to the most casual observer, and to any understanding. They are so great that we could throw yarns or cloths into Lowell or Lawrence, and sell them at a profit, though at a price less than the actual cost of the goods manufactured at those places. This being the case, how successfully may we compete with them in the general markets of the country! We could, if we choose, undersell them everywhere.

It is barely possible that there may be some apprehensions as to the facilities for transporting our goods, if they should be manufactured on the large scale which is recommended. But I think that upon this subject no fears need be entertained. Upon this point we might rest secure upon that homely but true maxim, which is readily applicable to great business matters as to anything else, that "necessity is the mother of invention." If we manufacture cotton in large quantities, there will, of necessity, be a corresponding diminution of its manufacture elsewhere. But the general demand for goods will be the same without any reference to localities where they are made. Consequently, the natural laws of trade would surely and speedily open up channels through which they would easily pass to market. But upon this point we are not left to speculative contingencies. At the present time nearly all prominent parts of our State may be reached by railroads or rivers. Other roads are projected, some of which are in process of construction. Roads will be gradually built, in proportion to the demand for them, and at no distant day they will be spread over our State like a net-work, if we but bestow the proper energy and enterprise in the development of our manufacturing and mineral resources. But as we are now we have outlets by rail and river from most parts of the State to all desired points within the interior markets, of the United States, or exporting cities on the Gulf and Atlantic sea board.

Thus far I have confined myself to facts and reasons designed to show that it is to the interests of capitalists to engage largely in the business of manufacturing. But the establishment of factories confers various incidental advantages to the community, which are of the very highest importance. These benefits are found in the profitable employment afforded to a particular class of persons who are particularly suited for factory labor. This branch of the subject is deserving of special consideration in discussions upon the subject of manufacturing enterprises in the South at the present time.

From the unemployed class of women, boys and girls, there might be employed 20,000 or 25,000 efficient factory operatives. That would be about twice the number employed in running the ten immense establishments at Lowell.

It is the policy of many of the European governments, and particularly that of England, to make labor, or originate the means of employment, whenever it is necessary either to prevent idleness or promote the public interest. It is not necessary, however, for Alabama to resort to such a measure. The desired end will be accomplished if capitalists only consult their true interests in the manner of employing their money. By so doing they will not only add to their wealth, but establish for themselves the enviable character of liberal patriots and public benefactors.

But the incidental benefit resulting from factories are not confined to the new employment which they furnish for operatives. They afford most advantageous facilities for the intellectual and moral improvement of a certain class of youth which otherwise grow up in ignorance. It is highly important to the success of any scheme of popular education, that there be systematic employment and associations. The chief difficulty heretofore encountered by our public school system has been the remoteness of settlements or sparseness of population. Many children were deprived of all educational advantages because a sufficient number of pupils could not be found within proper distance to sustain a competent teacher. The establishment of factories will go far to overcome these difficulties. They will draw together, in dense communities or villages, children that are now so remotely separated as to be deprived of all the advantages of gregarious society. A factory with 10,000 spindles and 250 or 300 looms will require 400 operatives. This number of operatives will necessarily require the settlement of at least 1200 persons within the vicinity of the factory. A village of that size, composed as it would be, mainly of women and children, would support one or more good schools.

In addition to the ordinary school, you will always find in such a village those whose zeal in the moral training of boys and girls will lead to the establishment of useful Sabbath schools. Moreover, you will find in such a community houses of public worship, where there will be preaching every Sabbath.

It will be observed that the figures, statements and reasoning employed in this communication have been confined to Alabama. If, however, the points I have attempted to make shall be found to possess any value, they are, of course, equally applicable to Georgia, Mississippi, or to any other cotton State, or to all of them combined. It will be an easy matter to adjust the statistical statements and calculations so as to suit one or more States.

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Rim and Mortise Night Latches,

CLOSET, CHEST, DRAWER, DESK and PADLOCKS,

Post Office Lock Boxes and Prison Locks,

Leeds' Gate Fixtures, Field's Shutter Bars, etc., etc.

The Yale Lock Manufacturing Co.,

STAMFORD, CONN.

The Best TUMBLER LOCK Ever Made.

New Pattern Key. No. 500 Yale Lock.

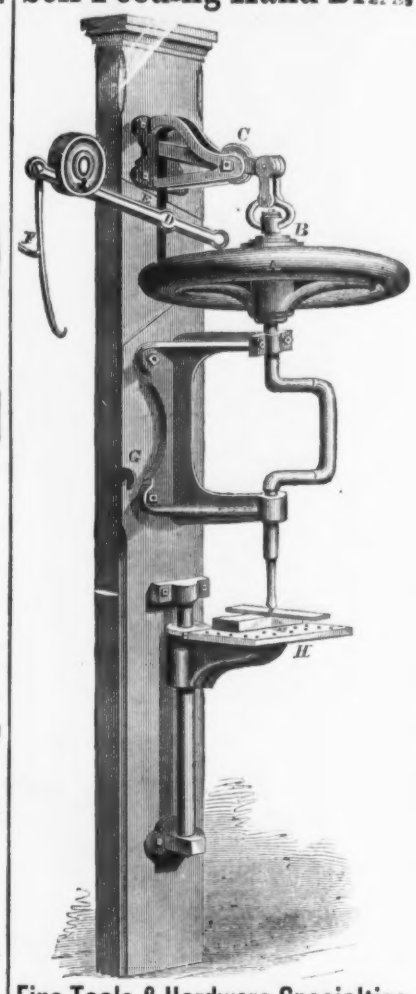
Samples sent on Application

Hardware.

BIDDLE MANU'FG CO.

PATENT

Self Feeding Hand Drill.



Fine Tools & Hardware Specialties

Warerooms,

78 Chambers Street, N. Y.

Send for catalogue. Sole Agents for the Pacific Coast,

CONROY, O'CONNOR & CO.,

San Francisco, Cal.

THE

Peck, Stow & Wilcox Co.,

MANUFACTURERS OF

TINNERS'

Tools and Machines,

AND

GENERAL HARDWARE

97 Chambers Street, New York.

Blacksmiths' Hand Drill.

Manufactured by **MORRELL & TIEBOUT,**

Cor. of Grand & First Sts., Williamsburg, N. Y.

Send for Circular and Price List.

New York Wholesale Prices, June 25, 1873.

HARDWARE.

Anvils.
Solid Cast Steel.....₱ ℔ 14c
Wright's.....₱ ℔ gold 12½c ; over 250 ℔s 13c, gold
Armitage's Mouse Hole.....gold 12c
Wilkinson's.....₱ ℔ gold 11½c
Eagle Anvil Co. ₱ ℔ 12c.....dis 15 @ 15&5 %

Apple Parers.
Turn Table, Lightning, Reading, Conqueror.....$8·50 ₱ doz
Union.....₱ doz 9 00
Bay State, Paring, Coring and Slicing.....$13 50 @ 15 00
Skeleton " " " 9 00
Climax Slicer.....9 00
Bay State Peach Parer.....$11 00 @ 11 50
Lightning " .....11 00 @ 11 50
Peach Stoner and Halver.....7 00

Augers and Bits.
Snell Mfg. Co.....dis 15 %
Russell Jennings.....dis 10 %
Douglass Mfg. Co., Extra.....dis 25 %
" " No. 1.....dis 25&5 %
" " " Hollow Augers.....dis 25 %
Cushman's Expanding Hollow Augers.....dis 20&10 %
Ives'.....dis 25 %
" Hollow Augers.....dis 30 %
" Expansive Augers.....dis 30 %
" " Bits.....dis 25 %
Andrews' Bits.....dis 20 %
Cook's Patent Augers.....dis 40 %
" " Bits.....dis 25&10 %
Shepardson's Double Cut Bits.....dis 20 %
Griswold's Patent.....dis 20 %
Cast Steel Cut Augers.....new list dis 25&10 %
" Auger Bits.....dis 25&10 %
Long Augers.....new list dis 30 %
Bonney's Patent Hollow.....$48 per doz—dis 25 %
Stearns'.....$48 per doz—dis 30 %
Morse's Bit Stock Drills.....dis 20 %

Axes.
Blood's.....$12 50 @ 14 00
Hunt's.....₱ doz $15 00 @ 17 50 net @ dis 5 %
Collins'.....₱ doz 12 00 @ 16 00 net @ dis 5 %
Hurd's.....₱ doz 12 50 @ 13 50
Schweitzer Mfg. Co.'s.....₱ doz 13 00 @ 15 00
Simmons'.....₱ doz 12 00 @ 13 00
Morris'.....₱ doz 12 50 @ 13 50
Red Jacket.....₱ doz 12 00 @ 12 50
Mann's.....₱ doz 13 00 @ 14 50
Powell Tool Co., "Peerless".....₱ doz 13 00 @ 14 50

Balances.
Chatillon's, Frary's, Morton's.....new list dis 15 %

Bands.
Plated.....add 10 ; dis %
Iron.....dis 15&5 %
Brass (Plated list).....dis 5 %
Oroide.....add 15 ; dis 5 %

Bells.
Hand, Light Brass.....dis 60&10 %
White Metal.....dis 45&10 %
Globe.....dis 20 %
Swiss Hand.....dis 10 %
Abbe's.....dis 10&10 %
Taylor's Patent Door.....net
Western Gong.....net
Brook's Crank.....net list
" Pull.....dis 15 %
Hart Mfg. Co., Crank and Pull.....net list
Cow—Common Wrought.....new list dis 33⅓ %
Western.....new list dis 33⅓ %
Kentucky "Star".....new list dis 10&10 %
Dodge's Genuine Kentucky.....new list dis 25 %
Yaw's Genuine.....dis 20 %

Bellows.
Blacksmiths'.....dis 10 %
Moulders'.....dis 15 %

Blind Fasteners.
Van Sand's.....₱ gross $1·4 00
Washburn's Patent.....₱ gross 14 00
Merriman's.....add 35 @ 40 %

Blind Staples.
Boardman's Patent, ½ in. and larger.....₱ ℔ 37½c
" " ⅝ in....." " 42 c

Bolts.
Cast Iron Barrel, Shutter, &c.....old list dis 50&10 %
Wrought Iron Barrel.....net
" " Square.....dis 10&10 %
Carriage and Tire, Common.....dis 65&10 %
" " " Norway Iron.....dis 40 %
Star, Philadelphia.....dis 40 %
Eagle, Philadelphia.....dis 40 %
Philadelphia Pattern, P. S. & W.....dis 50&5 %
Carriage and Tire, R. B. & W.....dis 50&5 %
Plow, R. B. & W.
Stove, R. B. & W.....dis 10 %
Union Nut Co.
Machine.....dis 20 @ 25 %

Boring Machines.
Kellogg's.....dis 10 @ 15 %
Snell Mfg. Co., Rice's Patent.....dis 15 %
" " Regular.....dis 15 %
Douglas Mfg. Co.....dis 20 %
Hovey's Angle.....$6 00 @ 6 25
" Upright.....4 25 @ 4 50
Mortising Machines, each.....$18 00

Braces.
Barber's Patent.....dis 30&10 %
Wilson Mfg. Co.....net @ add 5 %
Sportsford's Patent.....dis 37½ %
Noble's Patent.....dis 33⅓ %
Bartholomew's.....dis 15&10 %
" Patent.....dis 25 %
Q. S. Backus & Co.....dis 30&10 %

Bung Hole Borers.
Common and Ring.....dis 20 %
Enterprise Mfg. Co.....dis 20 %
Ives' Tap Borers.....dis 20 %

Butchers' Cleavers.
Bradley's.....dis 15 %
Beatty's.....new list dis 10 %

2	3	4	5	6	7	8	9
$19·00	$21·50	$24·00	$27·00	$30·00	$33·50	$36·50	$40·00

Hart Mfg. Co.....dis 45&10 %

0	1	2	3	4	5	6
$25·25	•$29·75	$30·25	$38·75	$43·55	$48·50	$54·00

Butts.
Wrought Brass.....new list dis 20 %
Cast Fast Joint, Narrow.....dis 15 %
" " Broad.....dis 30 %
Cast Loose Joint.....dis 40 %
" " Mayer.....dis 30 %
" " Parliament.....dis 30 %
Loose Pin Butts.....dis 40 %
Wrought Fast Joint, Narrow.....dis 10 @ — %
Wrought Broad.....dis 25 @ — %
" Loose Joint.....dis 15 @ — %
Wrought Table and Back Flaps.....net @ — %
Cast Butts, Ohio Butt Co.—
Narrow Fast Drilled and Wire Jointed (old list).....dis 10 %
Broad " " " .....dis 25 %
Broad Loose Drilled " " .....dis 35 %
Silver Tipped.....dis 40 %
Loose Joint, Japanned.....dis 25 %
" " Acorn and Silver Tipped.....dis 35 %
Palmer Blind Butts.....dis 30&10 %
Nicholson Blind Butts.....dis 30 @ 35 %
Parker's Blind Butts.....dis 25&10 @ 35 %
Clark's Blind Butts.....dis 30 @ 35 %
Seymour's.....dis 30 @ 35 %
Shepard's.....dis 30 @ 35 %
Garretson's.....dis 40 %
Standard.....dis 30 @ 35 %
Union Mfg. Co.'s Drilled Fast Narrow.....new list dis 25 %
" " " Broad.....dis 25 %
" " " Loose.....dis 35 %
Whitney & Wait's Bronze Metal.....dis 20 %

Caps—Percussion, per 1000.
G. D.....40c
Ely's E. B.....1-4s, 67½c ; 1-10s, 75c., gold
" Double Waterproof, 1-4s, $1·57½ ; 1-10s, $1·65c., gold
Colt's.....1-4s, 82½c ; 1-10s, 90c., gold

Cartridges.
Metallic.....dis 45 %

Cards.
Horse and Curry.....dis 20&10 %
Cotton.....dis 25 %
Wool.....dis 20 %

Casters.
Iron and Wood Wheel Plate.....new list dis 20&10 %
Brass Wheel Plate.....new list dis 30&10 %
Porcelain Wheel Plate.....new list dis 20&10 %

Chain—By the Cask.
English Coil.....net gold

₱ ℔	13¼	10¼	9½	9c	8¾	8¼c
	3-16	¼	5-16	⅜	7-16	½

Trace, 6½-10-2.....₱ pair, gold, 65c
Trace, 7-10-2.....₱ pair, gold, 70c
Galvanized Pump Chain.....₱ ℔ 14c
German Halter Chain.....new list, gold, dis 10 %
German Coil.....new list, gold, dis 10 %
Jack Chain, Iron.....dis 35 @ 40 %
" Brass.....dis 20 @ 25 %

Chalk.
White.....₱ gross, 60c
Red.....₱ gross, 80c
Blue.....₱ gross, 90c
Crayons.....₱ gross, 14c

Cherry Stoners.
"Faulds.".....₱ doz $9·00

Chisels.
Socket Firmers.....dis 60&5 @ 60&10 %
Socket Framing.....dis 60&10 %
Socket Corner.....dis 60&10
Tanged Firmers.....dis 40 @ 40&10 %
Butcher's.....$5·50 to £ gold—new list
Newbould's.....$5·50 to £ gold
Spear & Jackson's.....$5·50 to £ gold—new list

Clips, Axle.
Norway or Best.....dis 20 @ 30 %
Superior.....dis 40&5 %
"Star," Superior, Philadelphia.....dis 45&5 %

Coal Shovels.
Iron Handled.....₱ doz, $ 85 @ 1 25
Wooden Handled.....₱ doz, 1 00 @ 2 00

Coal Hods.
Smith, Burns & Co.....dis 25 %

No.	14	15	16	17	18	
Japanned	$9·00	9·75	10·50	12·00	13·50	per doz
Galvanized	13·00	14·50	15·50	17·50	19·50	"

Cocks.
Brass Racking.....dis 10&10 %
Lock and Globe.....dis 10 %

Coffee Mills.
Common Board and Box.....dis 10&5 %
Better Grades.....dis 10 %
Increase Wilson's.....new list dis 10 %
French Steel.....dis 10 @ 20 %
"Champion".....dis 20 %
Swift's.....dis 20 %

Compasses and Dividers.
Bemis.....dis 15&15 @ 20&5&15 %
Excelsior.....dis 30 %
Peck, Stow & Wilcox.....dis 20 %

Coopers' Tools.
Bradley's.....dis 15 @ 20 %
Chas. E. Little.....dis 15 @ 20 %

Corn Knives and Cutters.
Bradley's.....list net

Crucibles.
Gautier & Co.....₱ No. 5½c

Curry Combs.
Hotchkiss' and Kellogg's, Iron and Brass.....dis 10&5 %
Fitch's.....dis 20 %
Ruggles'.....dis 15 @ 20 %
Rubber.....₱ doz, $9·00—dis 10 %
Schweitzer Mfg. Co.....dis 20 %

Curtain Pins.
Slivered Glass.....dis 40&10 %

Cutlery.
American Table.
American Pocket.....dis 15 %

Door Springs.
Torrey's Patent.....$7·50 ₱ doz—dis 20&10 %
J. Palmer.....₱ doz $5·50
Challenge.—
Japanned.....₱ doz $4 00 @ 6 00
Bronzed.....₱ doz 5 00 @ 7 00
Nickel Plated.....₱ doz 6 50 @ 9 00
1 Gross lots.....dis 10 %
5 Gross lots.....dis 20 %

Drawing Knives.
.....dis 60 @ 60&10 %
Bradley's.....dis 25 %

Drills.
Ingersoll's Ratchet.....dis 25 %
Moore's Triple Acting Ratchet.....dis 20 %

Egg Beaters.
Monroe's.....₱ doz net $8·25 @ 8·50
Ashley's.....₱ doz net 2·25 @ 3·00
Earle's Patent.....₱ doz net 5·50 @ 6·00
Pratt's Aerating.....dis 10 %
Dover.....₱ doz net $6·00

Emery.
Genuine Chester—Regular Nos.....₱ ℔ 8c
" Flour and FF.....₱ ℔ 5c } dis 5 %
Washington Mills—Regular Nos.....₱ ℔ 8c
" Flour.....₱ ℔ 5c

Enameled and Tinned Ware.
Kettles.....dis 10 %
Sauce Pans, Glue Pots, &c.....dis 5 %

Faucets.
Cork Lined, Wood.....dis 55&10 %
Fenn's.....dis 50 %
" Cork Stops.....dis 40 %
Star.....dis 55&10 %
Frary's Patent Petroleum.....dis 10&10 %
Taylor's Pattern " .....dis 20&10 %
Wood and Metallic.....dis 40 %

Files.
American Best.....$5 00 to £ net
Nicholson—Mill.....5 00 to £ net
" Others.....5 00 to £ net
" Tapers (single cut).....5 00 to £ net
Newbould's.....5 50 to £ gold
J. & Riley Carr's.....5 50 @ 5 75 to £ gold
Stubs'.....5 50 to £ gold
Butcher's.....5 50 to £ gold
Spear & Jackson's.....5 50 to £ gold
Hargreaves, Smith & Co.'s.....4 75 to £ gold
Jowitt's.....5 25 to £ gold
"Western".....5 00 to £ net
W. K. & C. Peace's "Imperial".....5 25 to £ gold
R. Ibbotson.....5 00 to £ gold
Beam & Murray, "Cyclops".....4 85 to £ gold
Fisher's.....4 75 to £ gold
Goodlad's.....4 00 to £ gold
Moss & Gamble.....5 25 @ 5 50 to £ gold

Fluting Machines.
Acme.....$7 00 each net
Cole.....5 75 each net
Manville, No. 2.....7 00 each net
Knox, with 4-inch Rolls.....5 00 each net
" " 6 " .....6 00 each net
O. K.....6 50 each net
Peerless, 4-inch Rolls.....4 00 each net
" 5 " .....5 00 each net
Excelsior, No. 1.....4 75 each net
" No. 2.....6 50 each net
Diamond.....7 50 each net
Climax 7-inch Rolls.....8 00 each net
" 4½ " .....6 50 each net
Empire.....4 00 each net
Eureka, No. 1, 7-inch Roll.....8 00 each net
" No. 2, 5-inch Roll.....6 00 each net
K. F. M., 4-inch Roll.....5 50 each net
" 6-inch Roll.....6 00 each net
Carpenter's Self-Heating.....13 50 each net
Fairy, Self-Heater.....10 00 each net
National, 5-inch Rolls.....5 00 each net
Myer's Fashion Fluter, 4½-inch Rolls.....3 00 each net
Ponton Fluter, Bright.....$1 50—dis 25 %
" Galvanized.....2 00—dis 25 %

Fry Pans.
Tinned.....dis 20 %

₱ doz.....	$3·00	3·25	3·62	4·00	4·50	5·00	5·50	6·00	7·50
No.	0	1	2	3	4	5	6	7	8

Peck, Stow & Wilcox.....dis 20 %
Smith, Burns & Co., "Excelsior" Polished.....dis 20 %

₱ doz.....	$3·70	4·00	4·70	5·20	6·00	7·00	8·00	9·00
No.	1	2	3		5	6	7	8

Hammers.
Emmet Hammer Co.....dis 10 %
Maydole's.....new list net
Cheney's.....new list net
Verree.....dis 5 %
Yerks & Plumb.....new advanced list dis 5 @ 10 %
Minot & Co.....dis 15 %

Handles.
Hammer and Hatchet.....dis 10 %
Quakertown, Axe, Pick and Sledge.....dis 10 %
" Hammer and Hatchet.....net
Greensboro', Axe, Pick, Hammer, &c.....dis 10 %

Harness Snaps.
Judd's.....dis 30 %
Fitch's.....dis 30 %

Hatchets.
Isaiah Blood.....dis 10 %
Shingling, Nos. 1 2 3.....₱ doz $7 50 8 00 8 50
Claw, " 1 2 3.....₱ doz 8 50 9 00 9 50
Lathing, " 1 2 3.....₱ doz 7 50 8 00 8 50
Hunt's.....net
Shingling, Nos. 1 2 3.....₱ doz $7 25 8 00 8 75
Claw, " 1 2 3.....₱ doz 7 75 8 50 9 25
Lathing, " 1 2 3.....₱ doz 7 50 8 25 9 00
Hurd's.....dis 20 %
Shingling, Nos. 1 2 3.....₱ doz $8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s.....dis 25 %
Shingling, Nos. 1 2 3.....₱ doz $6 50 7 00 7 50
Claw, " 1 2 3.....₱ doz 7 25 7 75 8 25
Lathing, " 1 2 3.....₱ doz 6 50 7 00 7 50
Yerks & Plumb.....dis 10 %
Shingling, Nos. 1 2 3.....₱ doz $7 00 7 50 8 00
Claw, " 1 2 3.....₱ doz 7 50 8 00 8 50
Lathing, " 1 2 3.....₱ doz 7 00 7 50 8 00
Simmon's.....dis 10 @ 15 %
Shingling, Nos. 0 1 2 3.....₱ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
Broad, " 1 2 3.....₱ doz 9 00 10 00 12 00
" " 4 5 6.....₱ doz 14 00 16 00 18 00
" " 7 8.....₱ doz 20 00 22 00
Elephant.....dis 15 %
Shingling, Nos. 1 2 3.....₱ doz $8 00 8 50 9 00
Claw, " 1 2 3.....₱ doz 9 00 9 50 10 00
Lathing, " 1 2 3.....₱ doz 8 00 8 50 9 00
J. P. Verree & Co.....dis 5 %
Shingling, Nos. 1 2 3.....₱ doz $7 00 7 50 8 00
Claw, " 1 2 3.....₱ doz 7 50 8 00 8 50
Lathing, " 1 2 3.....₱ doz 7 00 7 50 8 00

Hinges.
Wrought Strap and T.....dis 30 %
Providence Plate.....{ 6 and 8 in. list 11c. } { over 8 in. list 9½c. } dis 10&5 %
Screw Hook and Strap.....{ 8, 10, 12 in. 8¾c } { 14 to 36 in. 7¼c } net

Hoes.
Solid Shank, C. S.....₱ doz $8 00—dis 20 @ 25 %
Socket.....₱ doz 9 00—dis 20 @ 25 %
Riveted Eye.....₱ doz 5 00—dis 20 @ 25 %
Grub.....dis 20 %
Planters'—Winsted.....add 10 %
Scovill.....add 33⅓ %
Scovill Pattern (Winsted).....add 20 %

Hooks.
Belt.....dis 50 %
Bench.....₱ doz net $5 00 @ 8 50
Wardrobe, Japanned.....new list dis 10&10 %
Hat and Coat " .....new list dis 15&10 %
Wrought Staples and Hooks and Staples.....dis 60 %
Wrought Hasps and Staples and Hasps, Hooks and Staples.....dis 60 %
Screw Hooks and Eyes, revised list.....dis 60&10 %

Horse Nails.
Putnam's.

No.	5	6	7	8	9	10
	32c	28c	26c	25c	24c	23c

In lots 2000 lbs. dis. 5 %.
Ausable.

No.	5	6	7	8	9	10
	30c	28c	26c	24c	23c	22c

In lots of 1000 lbs. 5 % discount.
Brundage.

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

In lots of 500 lbs., dis. 5 %.
American Pressed.

No.	5	6	7	8	7	10
	22c	20c	20c	20c	20c	20c

Perkins Finished (ready to drive).

No.	5	6	7	8	9	10
	29c	26c	24c	23c	22c	21c

Buffalo Forged.

No.	5	6	7	8	9	10
		28c	26c	25c	24c	23c

Globe (Pointed and Polished).

No.	5	6	7	8	9	10
	31c	28c	26c	25c	24c	23c

In lots of 1000 lbs., 5 % discount.
National (Pointed and Polished), Extra Finish.

No.	5	6	7	8	9	10
	30c	27c	25c	24c	23c	22c

In lots of 1000 lbs., dis 5 %.
Vulcan.

No.	5	6	7	8	9	10
	32c	30c	28c	27c	26c	25c

In lots of 500 lbs., 5 % discount.
" 1000 lbs., 7½ % discount.

New London Horse Nails.

No.	6	7	8	9	10
Great Western	27c	25c	24c	23c	22c
U B	29c	27c	26c	25c	24c

In lots of 1000 lbs., dis 5 %.
Star Brand.....₱ ℔ 16c
Morgan.....16c

Horse Shoes.
Burden.....₱ keg, $6 37½
Shoenberger.....₱ keg, 6 37½
R. I. Horse Shoe Co., Perkins Pattern.....₱ keg, 6 37½
" " R. I. Pattern.....₱ keg, 6 87½
Mule Shoes.....₱ keg, 7 37½

Kettles.
Enameled.....dis 10 %
Brass.....₱ ℔ 50c
In lots of 500 ℔s.....₱ ℔ net 45c

Knives.
Butcher and Shoe, "Ames".....dis 15 %
Butcher and Shoe, "Wood's".....dis 5 % cash
Hay and Straw, "Wadsworth's".....dis 15 %

Knobs.
Base—Common.....net
" Plush Tip.....dis 10 %
" Elastic End.....reduced list dis 10&10 %
Trenton Lock Co.....dis 40 %

Lanterns.
Brady's Patent.....dis 10 %
Ætna.....dis 10 %
Yankee.....dis 10 %
De Beque.....dis 10 %

Locks and Latches.
Cabinet—Eagle.....dis 25 %
Cabinet—Gaylord.....dis 25 %
Trunk.....dis 10 %
Continental.....dis 15 %
Shepardson's.....dis 20 %
Trenton Lock Co.....dis 40 %

Meat Cutters.
Dixon's (P. S. & W.).....dis 5 %

No.	1	2	3	4
₱ doz.	$14 00	$17 00	$19 00	$30 00

Hales'.....dis 25 %

No.	11	12	13
₱ doz.	$27 00	$33 00	$42 00

Perry's Champion (P. S. & W.).....dis 5 %

No.	200	300	400
₱ doz.	$22 00	$27 00	$40 00

Woodruff's (P. S. & W.).....dis 5 %

No.	100	150
₱ doz.	$15 00	$18 00

American.....dis 25 @ 25&5 %

Each.....	1	2	2½	3	4	5
	$6 00	$9 00	$14 00	$15 00	$30 00	$75 00

Molasses Gates.
Stebbins' Pattern.....dis 60&10 @ 70 %
Tinned ends.....dis 40&10 %
Weed's Patent Self-Boring.....dis 15 %
" without Auger Bit.....dis 40 @ 50 %
Patent Self-Measuring.....per doz $42 00—dis 20 %

Mouse Traps.
Wood Choker.....₱ doz holes, 16 @ 18c

Nails.
10d Cut (Standard).....See Trade Report.

Nuts and Washers.
Nuts, large.....3½c off list
" small.....4½c off list
Washers (as to quality).....3c @ 6c off list

Oil Stones.
Washita No. 1.....₱ ℔ 22c
" Slips.....₱ ℔ 44c
Hindostan.....₱ ℔ 6c dis 10 %
" Slips.....₱ ℔ 10c dis 10 %

Oilers.
Olmsted's.....dis 25&10 %
Broughton's.....dis 25&5 %
Common Zinc, Brass and Copper.....dis 20 %

Picks.
Washoe R. R. Nos.

₱ doz...	1	2	3	4	5
	$14·00	15·00	16·00	17·00	18·00
Washoe Coal, "	$8·50	9·00	10·00	11·00	13·00	15·00

Picture Nails and Knobs.
Richards' Patent.....dis 40 @ 40&10 %

Planes.
Auburn Bench and Fancy.....dis 15 %
Bailey's Patent Adjustable.....dis 15&10 %
Howland's Bench and Fancy.....dis 15 %
Chapin's " " .....dis 15 %
" 2d quality.....dis 15&5 %
Sandusky Tool Co.....dis 15 %
"Ogontz".....dis 15&5 %
Plane Irons.....list net
" Butcher's.....$5 50 to £ gold—new list
" Spear & Jackson's.. 5 50 to £ gold—new list
" Sandusky Tool Co.....list net

Pumps.
Douglas Cistern, etc.....new list dis 25 %
" S. & F.....new list dis 20 %

Rakes.
Cast Steel.....dis 25 %

$8 00	9 00	10 00	11 00
8	10	12	14 teeth.

Razor Straps.
Genuine Emerson (B. F. Badger).....dis 33⅓ %
Hunt's.....dis 25&10 %
Chapman.....dis 10 @ 15 %

Rivets.
Iron and Tinned.....dis 25 %
Copper Rivets and Burrs.....dis 10 %

Rods.
Stair.....new list dis 25 %
American Patent.....dis 25 %

Rope. Manufacturers' List.
Manila.....¾ inch and larger ₱ ℔ 18c
" .....⅝ inch ₱ ℔ 18½c
" .....½ and 5-16 inch ₱ ℔ 19c
" Lath Yarn.....₱ ℔ 19c
" Hay Rope.....₱ ℔ 19½c
Jute.....₱ ℔ 12c
Sisal.....¾ inch and larger ₱ ℔ 15½c
" .....⅝ inch ₱ ℔ 16c
" .....½ and 5-16 inch ₱ ℔ 16½c
" Hay Rope.....₱ ℔ 16c

Rules.
Boxwood and Ivory.....dis 60&10 %

Sad Irons.
.....₱ ℔ 5½ @ 6c

Sand Paper—dis 7½ @ 10 %
Beader & Adamson's (Flint) 00 to 1½.....$4 50 ₱ ream
" " 2, 2½ & 3.....5 00 "
Assorted.....4 50 "
Star.....₱ ream $3 50
Emery.....₱ ream $7 00 @ 12 00
Cowdin Mfg. Co.....dis 7½ @ 10 %
Diamond Flint, 00 to 1½.....per ream $4 50
" 2, 2½, 3 and assorted.....5 00
" Emery Paper.....per ream $7 00 to 12 00

Sash Locks.
Clark's.....dis 25 @ 30 %
Ferguson's.....dis 20 @ 25 %
Champion.....₱ gross $13 00 @ $15 00
Norwich.....dis 15 %

Sash Weights.
Solid Eyes.....₱ ℔ 3c

Sausage Fillers.
Perry's (P. S. & W.).....dis 5 %

No.	1	0
₱ doz.	$15 00	$21 00

Saw Rods.
.....list net

Saws.
Spear & Jackson's.....$4 50 to £ gold
John Spear.....$3 60 to £ gold
Am. Saw Co.....new list
Perforated Cross Cuts, all kinds.....68c ₱ foot
Inserted Tooth.....dis 10 %
All else.....dis 12½ %
Disston's Cross Cut, Circular and Mill.....dis 12½ %
Hand, Panel, Back, &c.....dis 7½ %
Butcher Bow Saws, Butcher Saw Blades, Hack Saw Blades.....dis 12½ %
H. W. Peace's Circulars.....dis 10 %
Other kinds.....dis 10 %
Wm. McNiece's Hand, Cross Cut and Circular.....new list dis 10 %
Lightning.....new list dis 20&12½ %

Scales.
Brown's.....dis 25&5 %
Fairbanks'.....new list dis 15 @ 20 %
Howe's.....dis 15&5 %
Shattuck's Counter and Union.....dis 15 %
National Platform.....dis 25 %
Eureka.....dis 25 %
Scale Beams.....dis 20 %
No. 1 300 to 1200 lbs.....90c ₱ cwt
No. 2 " " .....75c ₱ cwt

Screws.
American list of April 1, 1873.
Flat Head Iron.....dis 47½ %
Round Head Iron.....dis 45 %
Flat Head Brass.....dis 60 %
Round Head Brass.....dis 50 %
Round Head Silver Capped.....new list dis 20 %
Patent Gimlet Point Coach and Hand Rail.....dis 10 %
Bed.....list net

Scythe Snaths.
Blood's German Steel, Grass.....dis 20 %
" Cast " .....₱ doz $9 00
" Silver " " .....₱ doz 10 00
" German " Grain.....₱ doz 11 00
" Cast " " .....₱ doz 13 00
" Red Rover.....₱ doz 14 00
" Young America.....12 00
" Silver Clipper.....9 50
Scythe Snaths.....12 63
.....dis 20 %

Shears.
Cast Steel.....dis 60&10 %
Conn. Cutlery Co., new brand.....dis 60 %
Rowe's.....dis 50&10 %

Shovels and Spades.
Ames.....list July 1, '70, list net @ dis 2½ %
Rowland.....new list Feb. 8, '73, dis 20 %
Old Colony.....dis 2½ %

Shovels and Tongs.
Iron Head.....list net
Brass Head.....dis 5 %
Polished Steel.....new list dis 15 %

Slates.
Square Frames, Round Cornered, by case.....dis 60&10 %
Less than a case.....dis 50 @ 55 %
Oval Frames, by case.....dis 40 @ 40&10 %
Less than a case.....dis 30 %

Spoons.
Iron.....new advanced list, dis 10 %
By the case.....dis 20 %
Britannia.....dis 40 %
Plated A 1.....dis 25&10 %
German Silver.....net @ dis 10 %
Tinned (P. S. & W.)—
Teas.....$1·50 ₱ gross, net
Tables.....2·75 " net

Stocks and Dies.
.....dis 15 %

Stove Polish.
Joseph Dixon's.....₱ gross, $6 00 @ 6 25
Gold Medal.....₱ gross $5 50

Squares.
Steel.....dis 30 % ; full cases, dis 50&10 %
Iron.....dis 50 % ; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₱ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 20 %

Tacks.
Full Weight American Iron.....dis 35&7½ %
Half Weight American Iron.....dis 67½&7½ %
Carpet.....dis 7½ %
Brads American Half Weight.....dis 50&7½ %
Finishing Nails.....½ ⅝ ¾ 1 1¼ in. and over
₱ ℔.....25c 20c 18c 14c 13c dis 7½ %
Trunk and Clout.....½ ⅝ ¾ 1 1¼ in. and over
₱ ℔.....25c 20c 18c 14c 13c dis 7½ %
Copper Tacks.....₱ ℔ 56c—dis 7½ %
Iron Shoe Nails, ₱ ℔ 4-8 and longer, 10½c ; 3½-8, 11c.....dis 7½ %
Double Pointed.....new list dis 35½ %

Tapes, Measuring.
American Flask and Cap Co.....dis 10&10 %
Eddy's.....dis 10&10 %

Toe Calks.
.....₱ ℔ 12c

Tobacco Cutters.
Champion.....dis 20 %
Peck, Stow & Wilcox.....dis 10 %

Traps.
Newhouse.....dis 17½ %
Hotchkiss.....dis 20 %
Peck, Stow & Wilcox.....dis 30 %
Blake's Patent.....dis 15 @ 20 %

Vises.
Trenton Vises, Solid Box.
30 to 110 lbs.....17c
111 to 160 lbs.....18c
160 and over.....21½c
Peter Wright's.....₱ ℔ 15½c, gold
Wilson's Solid Box.....dis 10 @ 15 %
39 to 160 lbs.....18c
160 and upward.....21c
Backus & Union, Parallel.....dis 25 %
Buffalo, Parallel.....new list dis 15 %
Fisher & Norris' Double Screw Parallel...dis 15 @ 15&5 %

Wire.
Bright and Annealed.....Nos. 0 @ 18 dis 25 @ 30 %
" " " 19 @ 26 dis 35 @ 40 %
" " " 27 @ 36 dis 40 @ 45 %
Coppered.....Nos. 0 @ 18 dis 20 @ 22½ %
Galvanized.....dis 35 @ 40 %
Tinned.....dis 15 @ 20 %
Cast Steel.....5 @ 10 %
Tinned Broom Wire.....dis 20 @ 25 %
Galvanized Telegraph, Nos. 8 and 9.....₱ ℔ 10c @ 11c
" " " 10 and 11.....₱ ℔ 11c @ 12c
" " " 12.....₱ ℔ 11½c @ 12½c
Annealed Fence, Nos. 8 and 9.....dis 25 @ 30 %
" Grape, " 10 to 14.....dis 25 @ 30 %
Fence Staples.....₱ ℔ 20c
Stubs' Steel Wire.....$7 00 to ℔ gold

Wrenches.
Baxter's Adjustable "S".....dis 20 %
" Diagonal.....dis 20 %
Collin's & Co.'s.....new dis list 30 %
Coes' Genuine.....dis 30&10 %
" Pattern (Wrought).....dis 45 %
" " (Malleable).....dis 50 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 60&10 %
Davis' Patent Duplex.....dis 40 %

METALS.

IRON.—DUTY: Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. All subject to a reduction of 10 per cent. Railroad, 20 cents per 100 lbs. Boiler and Plate, 1½ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1.....₱ ton, $46 00 @ 50 00
Foundry No. 2....." 43 00 @ 45 00
Gray Forge....." 38 00 @ 40 00
White and Mottled.....
SCOTCH.
Gartsherrie.....nominally "
Coltness.....
Glengarnock....." 44 00 @ 45 00
Eglinton....." 42 00 @ 43 00

Bar Iron.
Am. Refined, at mill.....₱ ℔ 3·9 @ 4c

Rails.
Welsh, gold.....₱ ton, 67 00 @ 68 00
American, at works, currency....." 77 00 @ 80 00
Old Rails, D. H., currency....." 47 00 @ 50 00

Scrap.
Wrought Scrap, from yard....." 45 00

Bar Iron from Store.
Common Iron.
⅜ to 2 in. round and square.....₱ ton, ₱ $7 50
⅝x9-16 in " " ....." 92 50
⅛ in. " " ....." 95 00
2½ to 3 in. " ....." 92 50
1 to 6 in. wide x ⅜ and 1 in. thick....." 87 50
1¼ to 6 in wide x ¼ & 5-16 in. thick....." 92 50
1 and 1¼ in. x ¼ and 5-16....." 95 00
Swedish Iron.
1¼x⅜ and ½....." 185 00
1¼x⅜ to ⅝, and ⅞ square....." 180 00
1⅞ to 5x⅜ to ⅞ and ⅝ to 2-in. square....." 175 00
6 to 12x⅜ and ½.....
Refined Iron.
⅜ to 2 in. round and square....." 92 50
1 to 6 in. wide x ⅜ to 1 thick....." 92 50
1¼ to 6 in. wide x ¼ and 5-16 thick....." 97 50
1 and 1¼ x ¼ and 5-16....." 100 00
Large Rounds.
2⅝ to 2⅞, round and square....." 100 00
3, 3¼ and 3½ in....." 107 50
3¾ and 4 in....." 115 00
Rods—⅜ and 11-16, round and square....." 97 50
½ and 9-16, " " ....." 102 50
7-16, " " ....." 105 00
⅜, " " ....." 107 50
5-16, " " ....." 112 50
¼, " " ....." 117 50
3-16, " " ....." 140 00
Band Iron.
1 to 6 in. x 3-16 to No. 12....." 110 00
Horse Shoe Iron.
⅞ and ⅝ x ⅜, to ½.....
1 x ⅜, to ⅝....." 122 50
Ovals, Half Ovals and Half Rounds.
¼ to 1½.....₱ ton, $117 50
⅝ and 11-16....." 122 50
½ and 9-16....."

Paper Stock, Old Metals, &c.

(Dealers' Selling Prices.)

Canvas linen	5¾ @ 6
" cotton, No. 1	7 @ 7¼
" " No. 2	4
White linen rags, No. 1	7 @ 7¾
" " No. 2	5 @ 5⅝
Colored	3 @ 3½
Mixed woolens	2 @ 3
Soft woolens	6½ @ 7
Gunny bagging	2 @ 2½
Jute Butts	1⅝ @ 1¾
Kentucky bagging	3½ @ 3¾
Book stock	4½ @ 4¾
Waste paper and scraps	2½ @ 3
Rope cuttings	1½ @ 3
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5¼ @ 5½
" No. 2	4½ @ 4¾
Grass rope	4¾ @ 4½
Tarred Shaking	1¾ @ 2

Old Metal.

Copper	27 @ 28
Yellow metal	18 @ 22
Brass	18 @ 21
Old lead, solid	6½ @ 6¾
Tea lead	5½
Wrought iron	1¾ @ 2
Sheet iron	1 @
Cast iron	1 @ 1¼
Machinery iron	1¾ @ 2
Zinc	5½
Pewter, No. 1	26 @ 27
" No. 2	10 @ 12
Spelter	7

Paints, Oils, etc.

Paints.

Black, lamp—Coach Painters	₱ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	15c
" " best	26c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75c
" " " in oil	35 @ 65c
" Chinese, dry	33c
" Ultamarine	25 @ 30c
Brown, Spanish	1¼c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 28c
" " in oil	18 @ 25c
" Paris	good, 30c; best, 40c
" " in oil	" 30c; " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14½c
Red Lead, American	9¼c
" " English	10½c
" Venetian (N. C.) dry	2¾c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	3½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	$1 40
" English	1 86
" Trieste	1 16
" American, Common	23c
White Lead, American, pure dry	11½c
" " " in oil	12 c
White, Paris, English, prime	in bbls. 2¾ @ 2¾c
Yellow Ochre, French	2¼ @ 2¾c
" " in oil	asst'd cans, 11c; kegs, 8½c
" " Vermont	in casks 1½c
" Chrome	17 @ 21c
" " in oil	18 @ 28c
Zinc White, American No. 1 dry	9c
" 1, in oil	11c
" French (Paris)	11½c
" " in oil	12½c

Oils.

Linseed Raw	₱ gal. casks, 98c; bbls. 99c
" Boiled	" $1 03 " 1 04
Whale, Crude	"
" Bleached Winter	"
Sperm, Crude	"
" Winter unbleached	"
" Bleached	" 1 80
Seal, Extra Refined	" 87½c
Lard, Pure Winter	" 85c
" Spring	" 75c
Cotton Seed, Crude	" 55c
" Southern Yellow	" 65c
" White	" 75c
Neatsfoot, Winter	$1 10 @ $1 35
Natural Lubricating	bbls, 45c

Sundries.

Asphaltum	8c
Benzine	₱ gal. 17c
Chalk	1½c
" Block	"
Dryer, Patent, Am'n	asst cans, 10½c.; kegs, 9c
" " English	" 11c.; 9c
Flocks	
Frostings	50c
Glue, White	33 @ 45c
" Sheet	20c
Glaziers' Points, Zinc	9c
Gum, Copal	36c
" Damar	25c
" Shellac, English	52c
" " dark	46c
Litharge	10c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	47c
Whiting, Spanish	1¼c

Glass.

French Window—1st, 2d, 3d, and 4th qualities. Per box of 50 feet.

SINGLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$10·75	$9·75	$9·00	$8·25
11 x 14 & 12 x 13	11·50	10·25	9·75	8·75
10 x 16 to 14 x 26	12·50	11·50	10·25	9·00
18 x 22	13·25	12·00	10·75	9.50
15 x 26 to 20 x 30	15·75	14·00	12·00	10·25
22 x 30 to 24 x 30	19·75	16·75	13·50	
26 x 28 to 24 x 36	20·25	17·50	14·00	
26 x 36 to 26 x 44	22·75	20·25	15·50	
28 x 44 to 30 x 50	24·00	21·50	16·75	
30 x 52 to 30 x 54	27·25	24·00	18·75	
30 x 56 to 34 x 56	29.50	26·25	22·00	
34 x 58 to 34 x 60	31·50	29·50	25·00	
36 x 60 to 40 x 60	37·00	32·50	29·50	

DOUBLE.

SIZES.	I.	II.	III.	IV.
6 x 8 to 10 x 15	$16·00	$14·00	$13·50	$12·50
11 x 14 & 12 x 13	17·25	15·50	14·75	13·25
10 x 16 to 14 x 26	18·75	17·25	15·50	13·50
18 x 22	20·00	18·00	16·25	14·25
15 x 26 to 20 x 30	24·00	21·00	18·00	15·50
22 x 30 to 24 x 30	30·00	25·25	20·25	
26 x 28 to 24 x 36	31·00	26·50	21·00	
26 x 36 to 26 x 44	34·00	30·50	23·25	
28 x 44 to 30 x 50	36·00	32·25	25·25	
30 x 52 to 30 x 54	41·00	36·00	28·25	
30 x 56 to 34 x 56	45·00	39·50	32·00	
34 x 58 to 34 x 60	48·00	45·00	37·50	
36 x 60 to 40 x 60	55·00	49·00	45·00	

Sizes above—$12 ₱ box extra for every five inches. Discount to the trade 60 per cent.

Railway, Blacksmiths' and Miners' Tools,

Railroad and Coal Picks, Crow Bars, Mauls, Tamping Bars and Picks, Rail Tongs, Sledge, Hand, Stone and Striking Hammers, Smiths' Tongs, Gas Pipe Tongs, Telegraph Pole Bars, Cold Chisels, Wedges, Frocs, Cast Steel Drills.

Self-colored Picks.....$8·00 per dozen.
Ground and Polished..... 9·60 "

Send for Catalogue.

JAMES E. HALSEY,
Manufacturers' Agent,
76 Reade Street, New York.

HORACE DURRIE,

97 Chambers and 81 Reade Streets, N. Y.

Hardware Manufacturer,

AND AGENT FOR

RHODE ISLAND HORSE SHOE CO.
L. COES & CO.'S GENUINE SCREW WRENCHES.
NEW LONDON HORSE NAIL CO.
WHEELER, MADDEN & CLEMSON.
WHEELER, CLEMSON & CO., FILES.
AMOSKEAG AXE CO.
TUTTLE MANUFACTUING CO.
EMPIRE MILLS TWINES.
FRENCH, SWIFT & CO.'S AUGERS & BITTS.
AUBURN TOOL CO.'S PLANES.
WINSTED HOE CO.'S PLANTERS HOES AND TOE CALKS.
WITHERBY TOOL CO.'S CHISELS, DRAWING KNIVES AND BORING MACHINES.
OHIO BUTT CO.
STEPHENS & CO.'S RULES.
FISHER & NORRIS, EAGLE ANVILS,
BOSTON BELTING CO., RUBBER GOODS.

OHIO BUTT COMPANY,

JOLIET, ILL.

MANUFACTURERS OF

CAST BUTT HINGES,

Drilled and Wire Jointed, Fast and Loose, Loose Pin Reversible, Plain, Japanned, and Japanned with Silver Acorns. Loose Joint Japanned, and the same with Japanned or Silver Acorns.

We have appointed

HORACE DURRIE,

No. 97 Chambers St., New York,

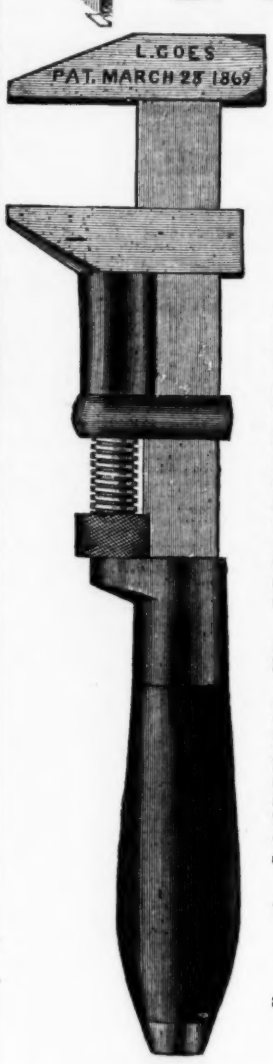
Our only Agent in NEW YORK, BOSTON, PHILADELPHIA and BALTIMORE, for the sale of our goods, and he is authorized to sell at our lowest factory rates.

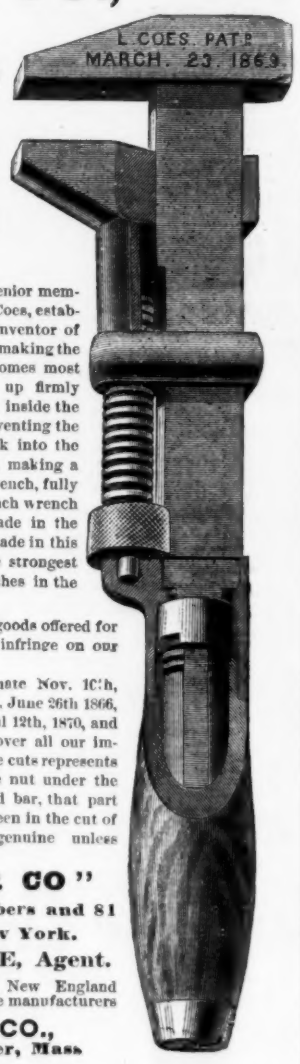
Ohio Butt Co.

L. COES & CO.,

Manufacturers of

L. COES'
Genuine Improved
PATENT
SCREW
WRENCHES,
Worcester, Mass.





Our Mr. L. Coes, formerly senior member of the firm of L. & A. G. Coes, established in 1839, is the Original Inventor of the Screw Wrench, and has, by making the bar *wider*, where the strain comes most severe, and screwing a nut up firmly against four *square* shoulders inside the ferrule, thereby *effectually* preventing the ferrule from being thrust back into the handle or getting loose, and making a larger screw than in the old wrench, fully succeeded in making a 12 inch wrench stronger than a 15 inch made in the usual manner. All sizes are made in this way, and are undoubtedly the strongest and best finished Screw Wrenches in the market.

There are *Imitations* of our goods offered for sale, that, without question, infringe on our Patents.

We hold Patents bearing date Nov. 10th, 1863 (re-issued June 1st, 1869), June 26th 1866, March 23d, 1869 (re-issued April 12th, 1870, and May 14th, 1872), which fully cover all our improvements. One of the above cuts represents a sectional view, showing the nut under the ferrule, and the strengthened bar, that part being covered by the jaw, as seen in the cut of wrench complete. None genuine unless stamped

"L. COES & CO"

Warehouse, 97 Chambers and 81 Reade Streets, New York.

HORACE DURRIE, Agent.

Parties ordering from the New England States can order direct from the manufacturers

L. COES & CO.,
Worcester, Mass.

MIDDLETOWN TOOL CO.,

MIDDLETOWN, CONN.,

MANUFACTURERS OF

The Celebrated "Baldwin" Plane Iron,
HENSHAW'S PATENT HARNESS SNAPS
GERMAN HARNESS SNAPS,
PAT. GAFF TOP-SAIL SELF-MOUSING SHIP HOOKS,

Plow, Fillettster & Dado Stops of all kinds, Set Screws for Plows, Bench Plane Starts, &c. Patent Washer Cutters. Plane Iron Screws to order of any size.

Send for Illustrated Catalogue and Price List.

Improved Stationary Engines.

Always on hand assortment of sizes from 10 to 200 horse power. Second-hand engines taken in exchange when desired.

Climax Turbine Water Wheels.

Assortment of sizes always on hand.

Pulleys, Shafting, Gearing and General Machinery.

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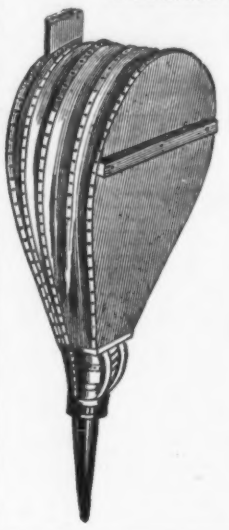
WHITEHILL, SMITH & HAMPSON,
NEWBURGH, N. Y.

NEWCOMB BRO'S SONS,

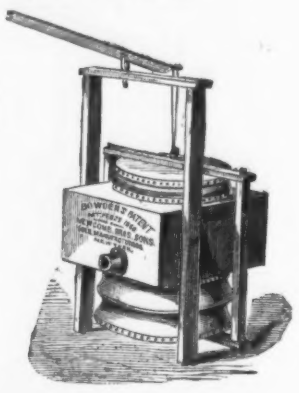
Manufacturers of

Smiths', Moulders' and Hand



Also the Sole Manufacturers of

Bowden's Patent
TRIPLE-ACTION
Bellows.



These Bellows are superior to all others now in use.

For further particulars send for descriptive circular and price list.

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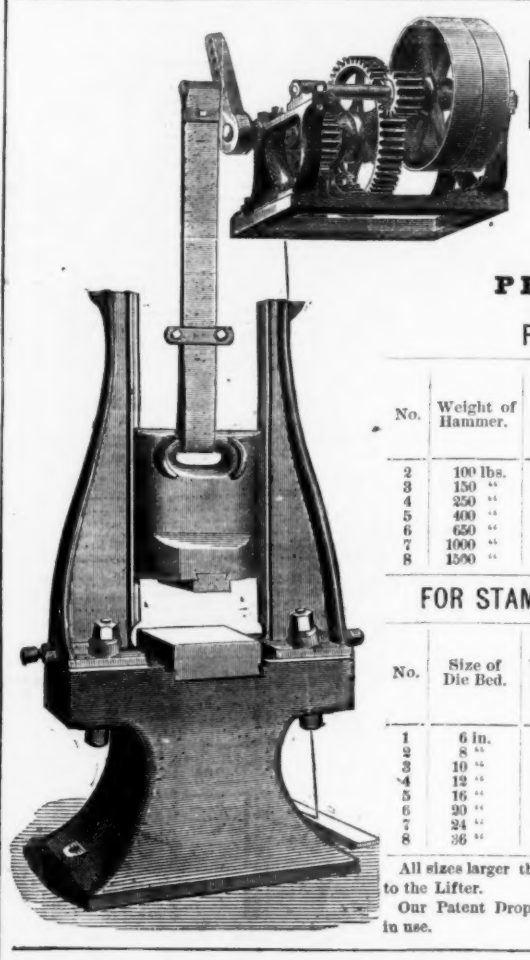
Canal Street, East Broadway and South Street Cars cross Montgomery St.



Peck's Patent
Drop Press
MILO PECK & CO.

SOLE MANUFACTURERS.

NEW HAVEN, CONN

PRICE LIST.

FOR FORGING.

No.	Weight of Hammer.	Distance between Uprights.	Lift of Hammer.	Price Complete.
2	100 lbs.	8 in.	24 in.	$ 330 00
3	150 "	10 "	30 "	467 00
4	250 "	12 "	30 "	750 00
5	400 "	16 "	30 "	900 00
6	650 "	16 "	30 "	1200 00
7	1000 "	16 "	30 "	1800 00
8	1500 "	16 "	30 "	2500 00

FOR STAMPING SHEET METALS.

No.	Size of Die Bed.	Weight of Hammer.	Price of Drop without Lifter.	Price of Lifter.
1	6 in.	50 lbs.	$ 137 50	$ 82 50
2	8 "	100 "	212 50	137 50
3	10 "	150 "	300 00	220 00
4	12 "	250 "	400 00	340 00
5	16 "	400 "	550 00	430 00
6	20 "	650 "	750 00	520 00
7	24 "	1000 "	1280 00	620 00
8	36 "	1500 "	1850 00	850 00

All sizes larger than No. 3 have Wrought Iron Cranks to the Lifter.

Our Patent Drop Lifter can be applied to any Drop in use.

CHASE'S BUTTON-HOLE CUTTER,

The BEST and CHEAPEST made.

Manufactured and for sale by

GOODNOW & WIGHTMAN,
Boston, Mass.

$10·00 per doz. Liberal discount to the Trade.

The National Screw Co.,

MANUFACTURERS OF

Patent Dovetailed Slot Gimlet-Pointed

IRON AND BRASS SCREWS.

COMPLETE ASSORTMENT OF SIZES.

RUSSELL & ERWIN MF'G. CO., Sole Agents

45 and 47 Chambers Street, New York.

P. O. Box 3288. **Orders filled promptly.**

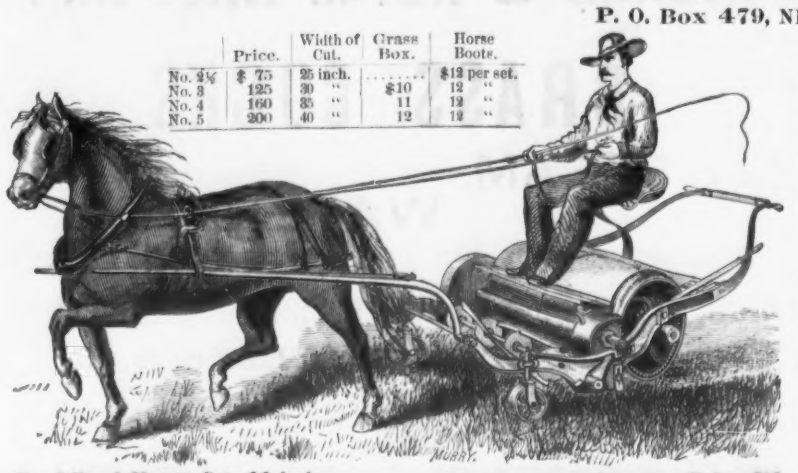
The Improved Excelsior Lawn Mowers,

FOR HAND OR HORSE POWER, MANUFACTURED BY

CHADBORN & COLDWELL MANUFACTURING CO.

P. O. Box 479, NEWBURGH, N. Y.

	Price.	Width of Cut.	Grass Box.	Horse Boots.
No. 2½	$ 75	25 inch.	.....	$12 per set.
No. 3	125	30 "	$10	12 "
No. 4	160	35 "	11	12 "
No. 5	200	40 "	12	12 "



For Sale by all the leading Hardware, Agricultural Implement and Seed Stores, in this and foreign countries.

Ask for the Excelsior and get the Best.

No. 0 Hand Mower—Cuts 11 inches.....Price, $16.
No. 1 " — " 14 " ..... " $25.
No. 2 " — " 18 " ..... " $30.

The No. 1 for general use, and warranted. The No. 2 for large lawns—when smooth.

The Excelsior is simple and durable. The *gearing* securely incased and will not clog. Has a *full roller*, without which no machine is perfect. A *ball ratchet*—"noiseless"—needs no oiling. Adjustable *wrought iron handle*. *Hangers* secured by bolts. The front rollers to these are adjustable, to vary the hight of cut. *Open balance wiper*—with *steel knives*—the only practicable means of securing strength and ease of draught. *Patent iron handle*, with attachment on each side of the machine—avoids the serious annoyance of a single wooden handle. The **Excelsior Lawn Mower** having been before the public for four years, and subjected to the most severe tests, the manufacturers feel warranted in asserting that for SUPERIORITY in *simplicity of construction* and *durability* it has no equal. It is *important* in either *Horse* or *Hand Lawn Mowers*, that their design should combine the *greatest strength* with least amount of *metal*; we therefore use only the very *best material*, together with *good workmanship*, enabling us to produce *Lawn Mowers* light *in weight*, of *easy draught*, and at a price within the reach of all.

The Excelsior has received the most favorable commendation from all, and the advantages claimed for it over other machines are fully appreciated wherever it is known. To this we add numerous testimonials, but the fact that our sales have greatly increased year by year, is the most convincing proof of its adaptation to the wants of the public.

GRAND SILVER MEDALS AWARDED THE EXCELSIORS AT THE

New England Fair, held at Lowell, Mass., Sept., 1871 and 1872; New Jersey State Fair, held at Waverly, N. J., Sept., 1871 and 1872; the first premium at the New York State Fair, 1871; Western New York Fair, 1871; Ohio State Fair, 1871 and 1872; Northern Ohio Fair, 1871 and 1872; Michigan State Fair, 1871 and 1872; Indiana State Fair, 1871; Wisconsin State Fair, 1871 and 1872; Tennessee State Fair, 1871; Virginia State Fair, 1871; South Carolina State Fair, 1871.

For description of Mowers, and particulars, send for catalogue. Agents wanted. A liberal discount to the trade.

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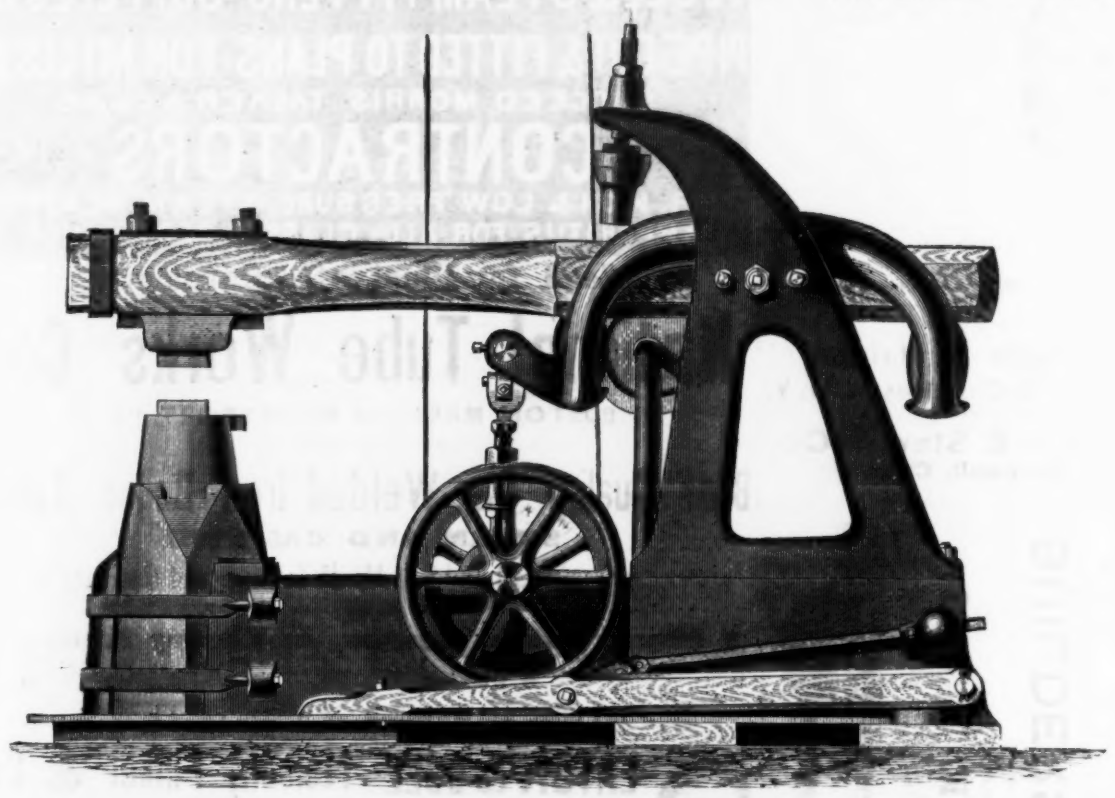

This Hammer is a great improvement over the old style of helve hammers. It is all made of Iron and Steel except the helve and cushions. It is portable, takes up but little room, and makes no noise except the stroke of the hammer. It takes less power to drive it, and it turns out more and better work. The helve is nicely balanced upon two adjustable hardened steel centers, and there is no bind or friction connected with its action. It will endure more hardships at less expense for repairs, and, consequently, outlasts any other. Its capacity is greatly increased, but not at the expense of its size, convenience or durability. It strikes a more accurate, forcible and elastic blow than any other hammer. It is being used and is peculiarly adapted for the exceeding difficult work of swedging cotton spindles; no other hammer has been able to do this work as perfectly and economically. It is the favorite of every hammersman; it promptly obeys his every touch, and he soon regards it as a thing of life. *We warrant them as recommended*, and refer you to the following parties now using them:

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Providence Tool Co., Providence, R. I.
Nicholson File Co., Providence, R. I.
Woonsocket Iron Foundry, Woonsocket, R. I.
John Berkenhead, Mansfield, Mass.
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Clapp, Fitch & Co., Auburn, N. Y.
Sweet, Barnes & Co., Syracuse, N. Y.
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Robert Doyle, Watseca, Ill.
Furst & Bradley Mfg. Co., Chicago, Ill.
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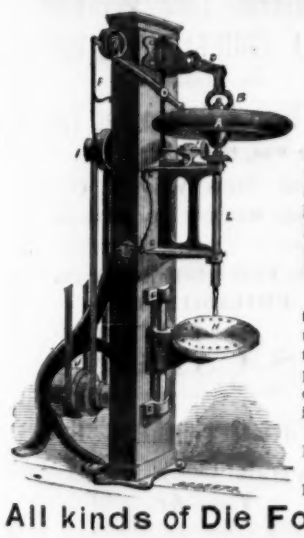

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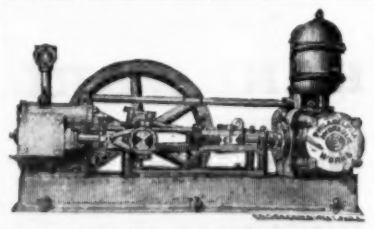

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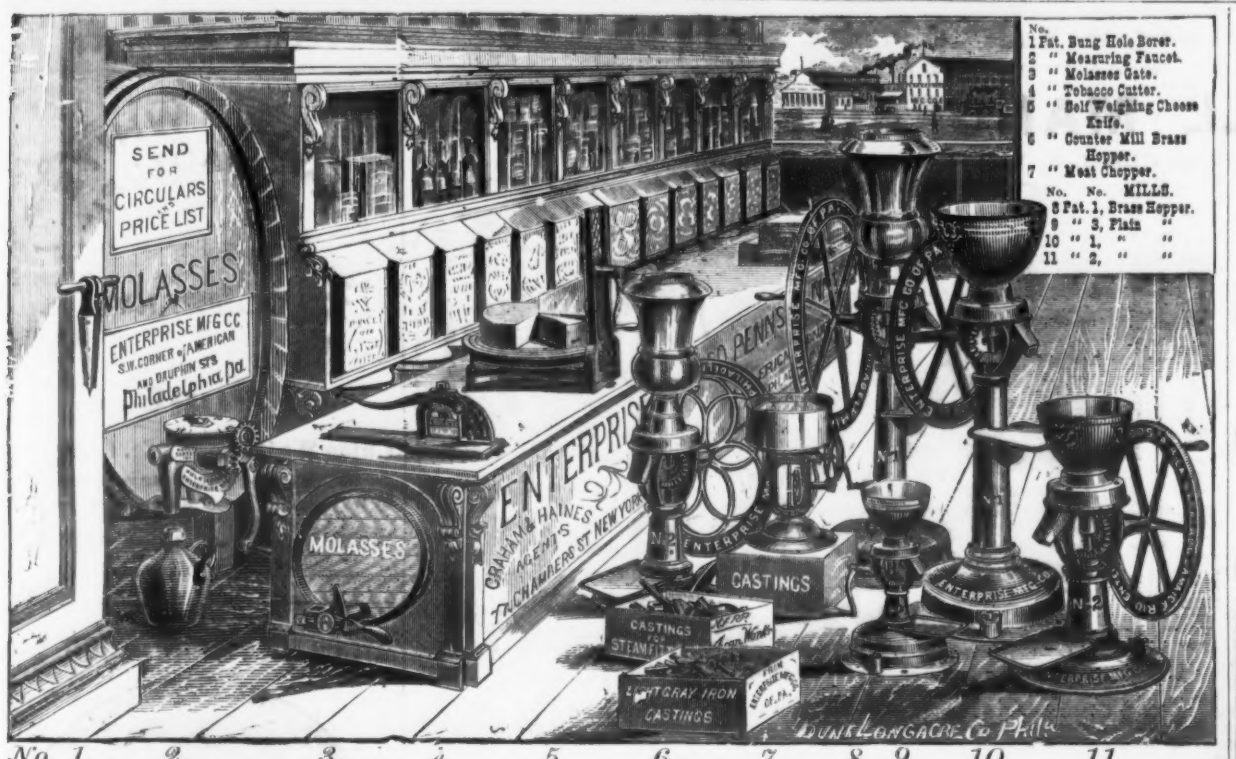
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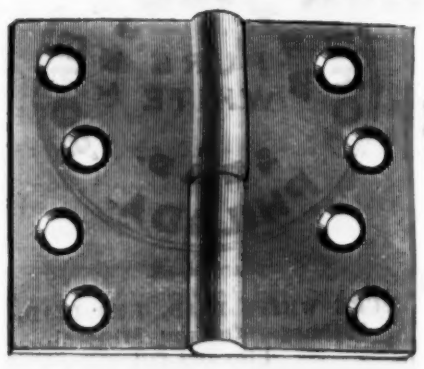

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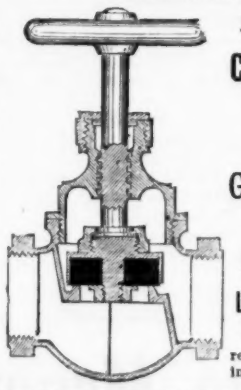

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Ausable	27	25	24	23	22
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Taylor's Petroleum Faucets.....dis 20 @ 20&10 %
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“ Light.....dis 5 %
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Stanley Rule and Level Co.....dis 40&10 %
Willis Thrall, No. 2.....dis 30&10 %
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“ “ “ by the case.....dis 67&7½ %
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“ “ “ by the case.....dis 7½ %
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Imitation “ “ “ .....dis 20&10 %
Wrenches.—Coes Genuine.....dis 30 @ 30&10 %
Coes Imitation Wrought Bar.....dis 40 @ 45 %
“ “ Malleable Bar.....dis 45 @ 50 %
“ “ (Kellogg) Malleable Bar.....dis 50&5 %
Tafts Wrought Bar.....60 %
Tafts Malleable Bar.....65 %
Wire.—No. 0 to 18.....dis 25 @ 30 %
No. 19 to 26.....dis 27½ @ 30 %
No. 27 to 36.....dis 33⅓ @ 35 %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 15 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.

June 9, 1873.

Axes, Chopping—“Francis Axe Co.'.....$13 00
Augers—C. B. Cut.....dis 30 %
Bar Tin.....41c
Bits, Auger—Pierce's.....dis 25 %
Jennings'.....dis 10 %
Bells, Cow—Faw's Genuine.....dis 20 %
Bellows—Smiths'.....dis 20 %
Bolts—Carriage and Tire, Diamond Neck.....dis 60&20 %
Braces, Bit—Barber's.....dis 30&10 %
Spofford's Patent.....dis 37½ %
Brads, Cut.....dis 50&7½ %
Boards—Stove, Brooks' Patent, new list.....dis 50 %
Butts—Brass.....dis 20 %
Cast Loose Joint.....dis 40 %
“ “ Pin.....dis 30 %
“ “ “ Japanned.....dis 30 %
“ “ “ Silver Tipped.....dis 20 %
Wrought Narrow.....dis 10&10 %
“ Broad, Loose Joint.....dis 30&10 %
“ Table and Back Flaps.....dis 10 %
Wrought Butts, Loose Pin.....dis 15&10 %
Belting—Rubber.....dis 30 @ 33⅓ %
Leather, new list.....dis 30 @ 30&5 %
Beaters, Egg, “ Peerless”.....per doz $4 50
Brick—Bath (box of 2 doz) Best English.....$1 50
“ Rutherford”.....$1 25
Bung Borers—“ Enterprise”.....dis 10&10 %
Chalk—White, Carpenter's.....₩ gross, 60c
Iced, Carpenter's.....“ 80c
Blue, “ .....“ 90c
Crayon School.....“ 14c
Chisels—Firmer Socket.....dis 60 @ 60&10 %
Framing Socket.....dis 60 @ 60&10 %
Corner Socket Chisels.....dis 60 @ 60&10 %
Slick's Carpenters'.....dis 60 @ 60&10 %
Castings—Malleable.....₩ lb 10½c
Cherry Seeders.....per doz $12 00
Elbows—Corrugated.....5 5½ 6 7 } dis 10 %
Charcoal.....$4·25 5·25 5·25 6·50
Russia.....10·00 13·00 13·00 14·00
Files—Wheeler, Madden & Clemson's.....dis 42½ %
Freezers, Ice Cream—“ Champion”.....dis 33⅓ %
Gates—Molasses—
Patent Self-Measuring.....₩ doz., $43 00; dis 10&10 %
Hinges—Window Blind—
Shephard's Standard, and Clark's.....dis 40 %
Garretson's.....dis 40 %
Wrought Strap and T.....dis 25 %
Hods, Coal—Plain, Black and Galvanized....new list net
Funnel, Black and Galvanized.....new list net
Fancy and Helmet.....new list net
Hammers—Maydole's.....net
Yerkes & Plumb's.....dis 5 @ 10 %
Hooks and Staples—Wrought.....dis 60 %
Hooks—Belt.....dis 50 %
Hasps and Staples—Wrought.....dis 60 %
Planes, Bench.....dis 15 %
Sad Irons.....₩ lb 5¼c
Kettles—Brass.....₩ lb, 50c
Enameled.....new list dis 40 %
Knives, Drawing—Oval No. 1.....dis 60 @ 60&10 %
Razor Blade.....dis 37½&20 @ 37½, 20&5 %
Lanterns “ Peerless,”....No. 1 5 10
₩ doz $26 00 $12 50 $15 00 dis 10 %
“ Radiant”.....No. 75 100 150 175
₩ doz $13 13 $13 13 $22 50 $22 50 dis 20 %
Mica.....net 50 lbs., 5 %; 100 lbs., 10 %; 200 lbs., 20 %
Machines—Apple Paring, “ Reading,”.....$6 50 ₩ doz
Tinmen's.....
Mills, Coffee—Box and Slide, common.....dis 10&5 %
Box Union and Eagle.....dis 10 %
“ Champion”.....dis 10&10 %
Nails—Cut, Chesapeake.....$4 75 rates
Clout and Finishing.....dis 7½ %
Shoe.....dis 7½ %
Horse, Ausable.....No. 5 6 7 8 9 10
20 27 25 24 23 22c
“ “ Finished & Pointed.....add 1c ₩ lb
“ “ 1000 lbs.....dis 5 %
“ Clinton.....No. 6 7 8 9 10
23 21 20 19 18c
Packing—Rubber.....dis 30 @ 33⅓ %
Pencils, Slate—Soapstone.....4 5 6 in.
30 40 50c. ₩ 100
Case lots.....dis 20 %
Paint—White Lead, U. S. Gov't.....₩ lb 9½c
Rivets—Iron, Black and Tinned.....dis 20 %
Copper.....dis 10 %
Rope—Manila, ¼ inch and larger.....₩ lb 17¾c
Rules—Boxwood and Ivory, Stephens.....dis 50&10 %
Staples—Blind, Boardman's Pat., ⅛ & ¾.....₩ lb 37½c
Skates—White's.....dis 20 %
Straps, Skate—Russet and Black.....net @ 20 %
Spoons, Iron Tinned.....dis 10 %
“ by the case.....dis 20 %
Plated Rogers' A No. 1.....dis 25&5 %
Britannia.....dis — @ 25&10 %
Squares—Steel and Iron.....new list 50 %
Shoes, Horse—H. Burden & Sons.....₩ keg $6 50
Shovels & Spades—Shepard, Forsyth & Dennison....15 %
Saws—Henry Disston & Sons.....dis 5 %
Scales—Buffalo Scale Works.....dis 25 %
Fairbanks.....dis 15 %
Shears—Seymour's.....dis 50 %
Tools—Timmins'.....
Traps, Steel—Newhouse.....dis 20 %
Tacks—Half Weight Am. Iron.....dis 70&7½ %
Vises—Parallel, Buffalo.....dis 15 %
Wrenches—Coes' genuine.....dis 30&10 %
Coes' Imitation.....dis 50&10 %
Tafts' Pattern.....dis 65&10 %
Ware—French, Tinned and Iron.....dis 20 %
Stamped and Japanned.....net
Cast Iron Hollow.....dis 30 @ 25 %
Tin Plates.—Add for each X.....2·50
10x14, IC. Charcoal...$13·75 | 14x20 C. terne..$12·00 @ 12 50
12x12, “ ... 14·25 | 20x28 C. “ 26 50
12½x17, “ ... 13·25 | 20x28 X. “ ..... 30·50
14x20, “ ... 14·75
Pig Tin—Straits.....29c @ 40
Banca.....46c @ 47
Solder.....No. 1, 22c; No. 2, 20c
Sheet Zinc, “ Lasalle”..1000 500 100 ₩ casks
$11·25 $11·35 $11·55 ₩ 100 ₩s
Iron Wire—Bright and Annealed.....dis 25 %
Coppered.....dis 20 %
Tinned.....dis 15 %
Tinned Broom, Nos. 20 21 22 ....dis 20 %
20c 21c 21c
Copper—Sheathing 14 @ 18 oz.....₩ ₩ 42c
Planished.....₩ ₩ 49 @ 51c
Bottoms.....₩ ₩ 41c
Bolts.....₩ ₩ 45c
Braziers' Sheets.....₩ ₩ 45c
Sheet Iron.—
24 Common.....$6 10
24 W. D. Wood & Co., Smooth Finish.....7 25
Am. Russia.....A. B.
14¼c 12½c
Gen. Russia, No. 1 stained.....20½c
“ clean.....21½c
Galvanized.....dis 20 %

BOSTON.

(Corrected by Fuller, Dana & Fitz.)

Tin Plates.— ₩ box | L.C. Coke..... @ $13 00
I. C. Charcoal.. @ $14 25 | “ Terne..... @ 13 00
Pig Tin.— ₩ ₩ | Straits, gold..... 33c
Banca, gold..... 39c | English “ 33c
Copper.— ₩ ₩ | Braziers..... 45c
Sheathing..... 43c | Ingot..... 37c
Yellow 33c | Old.....
Bolt..... 45c |
Lead.— ₩ ₩ | Sheet and Pipe..... 9·45c
Spanish Pig, gold 6¾c | Old..... 6¾c
Spelter. ₩ ₩ | American, gold.... 7c
Silesian, gold..... 8c |
Zinc.—Sheet.....₩ ₩ 11c
Iron.—Sheet Iron, Russia, gold.....₩ ₩ 18c
Sheet Iron, English.....“ 7c @ 7¾c
“ “ American.....“ 8c
“ “ Galvanized.....“ 11c @ 18c
Swedes Bar Iron, Flat, gold....₩ ton, $145 00 @ $155 00
“ Shoe Shapes, gold..... 160 00 @
Norway Bar Iron, Flats, gold..... 145 00 @ 152 00
“ Shapes, gold..... 157 50 @
“ Round, 2 in. to ¾ in., gold.... 147 50 @ 152 50
“ 11-16 to ⅝ in. “ .... 165 00 @
“ 5-16 to ¼ in. “ .... 167 50 @
Nail Rods, Rolled “ .... 185 00 @
“ “ U. B. “ .... 172 50 @
“ “ Henzon “ .... 167 50 @
“ “ Vasa “ .... 162 50 @
“ “ N I W “ .... 160 00 @
English Refined Bar Iron..... 95 00 @
Scotch Pig Iron..... 50 00 @ 55 00
American “ ..... 42 50 @ 50 00
Wrought Scrap Iron..... 47 50 @ 50 00
Steel.— ₩ ₩ | German 11c
Eng. Tool, gold 16c | Spring..... 9c
“ Mach. “ 10c | Tire..... 8c
American Tool 16c | Sleigh Shoe..... 6¾c
“ Mach 11c | Toe Calk..... 8¾c
Bessemer.....8¾c @ 9½c

PITTSBURGH.

Card Rates, 60 days.

Flat Bar.—
1½ to 4 x ⅜ to 1 inch..3·8c
4½ to 6 x ⅜ to 1 inch..4·0c
1⅜ to 6 x 1⅜ to 1½ in..4·2c
Horse Shoes.—
All sizes.....5·3c
Heavy Bands.—
3½ to 6 x ¼ & 5-16 in..4·4c
1⅜ to 9¾ x ¼ & 5-16 in..4·8c
Light Bands.—
3 to 6 x 3-16 to No. 12..4·8c
1¼ to 2¾ x 3-16 to No. 12.....5·0c
Hoops.—2½ to 3 in.....5·1c
3¼ to 4¾ in.....5·3c
1¾ to 2 in.....5·3c
1⅜ to 1 11-16 in.....5·6c
1¼ & 1¾ in.....5·9c
Round and Square.—
1 to 1¾ in.....3·8c
2 to 2¾ in.....4·1c
3 to 3½ in.....4·3c
3¾ to 4 in.....4·8c
⅞ to 9-16 in.....4·2c
Oval Iron.—
⅝ to 1¼ in.....4·4c
⅝ to ¾ in.....4·6c
Half Oval and Half Round.—
⅝ to 1¼ in.....4·7c
⅝ to ¾ in.....5·2c
Sheet Iron, 10 to 14.....5·4
“ 15 to 20.....4·6
“ 21 to 24.....4·8
“ 25 to 26.....5·0
“ 27.....5·2
All sheets over 28 in. wide, ¼c. ₩ ₩ extra.
Tank Iron.—
3-16, ¼ & ⅝ in. thick..5·6c
Boiler Plate Iron.....7·5c
Heads not flanging....6·5c
Railroad Iron—Countersunk and Punched.—
1¼ x ⅝, 7-16 & ½ in...5·2c
1¾ x ¾ & 5-16 in.....5·7c
Extras for Cutting to Length.—
Flat bars and rounds and squares.....1c
Flat bars for tire.....1c
Heavy bands.....3c
Nails—Standard list.....

1¼ & 1¾ x ⅜ to ¾ in....4·0c
1 & 1¼ x ⅜ to ¾ in.....4·1c
⅝, ¾ & ⅞ x ⅜ to ¾ in..4·2c
Nail rods.....7·7c
⅝ to 1¼ x ¼ & 5-16 in...4·8c
½ to ⅞ x ¼ & 5-16 in...5·0c
1 in.....6·3c
⅞ in.....6·8c
¾ in.....7·3c
⅝ in.....7·8c
½ in.....8·3c
½ to 7-16.....4·5c
⅜ in.....4·6c
5-16 in.....5·0c
¼ in.....5·4c
5-16 in.....7·4c
¼ in.....4·8c
⅜ in.....5·4c

	Boiled.	Charcoal.	Jun.
	6·4	6·9	8·4
	4·6	7·1	8·6
	4·8	7·3	8·8
	5·0	7·5	9·0
	5·2	7·7	9·2

Heads flanging.....8·5c
Plow Slubs.....6·4c
Plow Wings.....6·9c
1¼, 1¾ & 2 x ½ & ⅝ in..4·7c
1¼ x ⅝ in.....4·9c
Light bands and wagon box iron.....4c
Hoops.....5c

REMOVAL.

Established in 1812.

HOBART'S TACKS.

Manufactured by

Dunbar, Hobart & Whidden,

Office and Salesroom,

116 Chambers Street, N. Y.

Factory, SOUTH ABINGTON, MASS.

Manufacturers of

American, Swedes and Copper Tacks, Tinned Leathered and Large Head Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points, Iron, Steel, Copper, Zinc and Brass Shoe Nails, HEEL and TOE PLATES, STEEL SHANKS, and FANCY HEAD NAILS, SILVER or JAPANNED LINING and SADDLE NAILS.

A full assortment always on hand at salesrooms, for immediate delivery if required.

Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

AMERICAN TACK Co

MANUFACTURERS OF

Copper, Swedes, and Iron Tacks

BRUSH, LACE AND GIMP TACKS,

Leathered, Tinned, and Iron Carpet Tacks; Finishing, Black, and Tinned Trunk Nails

Hungarian and Cigar Box Nails;

COPPER and IRON BOAT NAILS

ZINC, COPPER, STEEL, and IRON SHOE NAILS

2d and 3d FINE NAILS;

Bright and Tinned Roofing Nails

BRADS, PATENT BRADS, &c.

Factory, Fairhaven, Mass.

Salesroom, 117 Chambers Street, NEW YORK

N. B.—Any variation from the regular size or shap of the above named goods cut from sample to order.

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Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedes Iron, Leathered, Carpet, Lacquered Gimp Tacks; Finishing, Hungarian, Tinned, Clout and Cigar Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY,

Grundy & Kenworthy,

HARDWARE.

165 Greenwich Street,

Agent for the Philadelphia Star Carriage and Tee Nails.

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PLYMOUTH TACK AND RIVET WORKS

PLYMOUTH, MASS., manufacturer of

TACKS, BRADS, NAILS AND

RIVETS.

Swedes and Common Iron Tacks; Leathered, Carpet, Brush, Lace and Gimp Tacks; Finishing, Hungarian, 2d and 3d Fine, Trunk, Clout, and Cigar Box Nails; Iron and Tinned Trunk Nails; Zinc, Iron, Copper and Tin Shoe Nails; Brads and Patent Brads; Glaziers' Points, &c., &c., &c. COPPER, BRASS AND IRON RIVETS, of all kinds. Coopers' Rivets, Boiled and In casks of 100 lbs. each. Hose, Belt and Shoe Tacks and Burs. Oval and Countersunk Heads of extra lengths, made to order. SHIP AND BOILER RIVETS OF ALL SIZES AND LENGTHS.

GEO. W. BRUCE,

No. 1 Platt Street,

Continues to import

Nettlefold & Chamberlain's,

IRON AND BRASS SCREWS, AND WIRE GOODS, RIVETS, &c.,

and assures the trade that his stock, assortment and prices are not equaled by any other parties, whatever their pretentions. NEW YORK, April 1st, 1873.

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NICKEL PLATER,

LICENSED BY

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Capron's Improved Turbine WATER WHEEL.

POLISHED & DETACHABLE BUCKETS

CHEAPEST & BEST WHEEL MADE.

CAPRON WATER WHEEL CO. HUDSON, N.Y.

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Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and Steel Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails,

Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

☞ Any variations from the regular size or shape of the above named goods made from samples, to order. ☜

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L. B. Taylor's Patent Speed Indicator.

To ascertain the number of revolutions made by a shaft in any given time: Take the Indicator by the handle in the right hand, holding your watch in the left, press the point of the spindle gently against the end and center of the shaft. To every hundred revolutions of the shaft the Hundred Pointer will make one revolution, while the Thousand Pointer will indicate one number, the dial being marked into ten parts. It may be applied to a shaft revolving either to the right or left

CONN. 1866 CUTLERY CO. NAUGATUCK TRADE MARK

Manufactured only by CONN. CUTLERY CO., NAUGATUCK, CONN.,

TO WHOM ALL ORDERS SHOULD BE ADDRESSED.

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MANUFACTURERS OF

WROUGHT IRON BUTTS,

All our goods are manufactured from patent faced iron plates; they have a smooth face and bright finish.

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HORIZONTAL

Ice Cream Freezer

(Tingley's Patent), will produce a finer quality of Cream in less time and with less labor than any other Freezer made. Is perfectly air tight, and will pay the entire cost of the machine in one season, in saving of ice alone. Sizes from three to forty quarts. Call and see it or send for catalogue. CHAS. G. BLATCHLEY, Manufacturer,

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Steel.

THREE 1st CLASS PRIZE MEDALS. CLASSES 1, 21, 22, Great Exhibition of Industry, LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

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(Established 1752.)

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BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
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WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools, warranted not to crack in hardening Taps of any size.
Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
English Spring and Plow Plate Steel.
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BARROW IN FURNESS,

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Unsurpassed, if equaled, in quality.

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Bailey Street and Broad Lane Steel Works, } SHEFFIELD, ENGLAND.

Particular attention is paid to quality and temper for

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ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

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Warranted superior to any manufactured in this or any other country.

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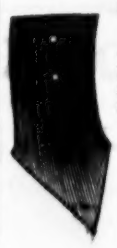

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Nellis' Original Harpoon Horse Hay Fork Improved.

Nellis' Grapple and Pulleys

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With the exception of our Horse Hay Fork and Fixtures we make no complete Implement. Agricultural Steels and Irons we make a specialty. From the universal approval our goods have secured by actual test in the hands of Implement Makers and Farmers from the Atlantic to the Pacific, and with our facilities, experience and improvements, we frankly assure the Trade of our ability to meet the requirements of the age. All of our Steel Goods have imprint of our Trade Mark.

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Sheffield Steel Works.

(Established in 1848.)

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Manufacturers of Extra Quality Tool

CAST STEEL,

Patent Rolled

SAW PLATES,

All descriptions of Cast and German

Spring and Plow Steel

Elliptic and Side Springs, Seat Springs,

AXLES, STEEL TIRE,

Plow Wings, Shares, Cultivators,

Reaper Bars, Crow Bars, &c., &c.

Warehouse, 83 Water and 100 First Streets.

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Minerva & Beaver Iron & Steel Works,

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MANUFACTURERS OF

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TIRE, TOE CORK, SLEIGH SHOE, BLISTER & PLOW STEEL.

Also, Plow and other Iron.

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A full assortment of "Jenks" Spring Steel in stock.

MILLER, BARR & PARKIN,

Crescent Steel Works,

PITTSBURGH, PA.,

Manufacturers of all descriptions of

STEEL

EQUAL TO ANY IN THE MARKET.

Office.....339 Liberty St.,

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Gunpowder.

GUNPOWDER.

DUPONT'S

Sporting, Shipping, and Mining

POWDER.

DUPONT'S GUNPOWDER MILLS,

ESTABLISHED IN 1801,

Have maintained their great reputation for 70 years. Manufacture the

Celebrated Eagle Ducking, Eagle Rifle and Diamond Grain Powder.

Also, SPORTING, MINING, SHIPPING, AND BLASTING POWDER

of all kinds and descriptions.

For sale in all parts of the country. Represented by

F. L. KNEELAND,

70 Wall Street, NEW YORK.

GUN-POWDER

LAFLIN & RAND POWDER CO.

21 Park Row, New York,

invite the attention of the the Hardware Trade to their facilities for delivering

BLASTING, MINING and RIFLE

POWDER

IN EVERY PART OF THE UNITED STATES, from having agencies and magazines at all prominent points, beside our works at

Newburg, Saugerties, Kingston, and Catskill, N. Y.; Scranton, Carbondale, and Pottsville, Pa.; Baltimore, Md., and Platteville, Wis.

The superiority is well known of our brands Rifle Powder:

Orange Rifle, Orange Ducking
Lightning, Audubon.

SAFETY-FUSE at wholesale.

Steel.

HUSSEY, WELLS & CO.

MANUFACTURERS OF ALL DESCRIPTIONS OF

CAST STEEL,

INCLUDING

Best Refined Steel for Edge Tools.

PARTICULAR ATTENTION PAID TO THE MANUFACTURE OF STEEL FOR

Railroad Supplies, Homogeneous Plates

FOR LOCOMOTIVES, BOILERS AND FIRE BOXES,

Smoke-Stack Steel, Cast Steel Forgings for Crank Pins, Car Axles, &c.

ALSO, MANUFACTURERS OF THE CELEBRATED BRAND

"Hussey, Wells & Co. Cast Spring Steel,"

For Elliptic Springs for Railroad Cars & Locomotives.

PENN AND SEVENTEENTH STS., PITTSBURGH, PA.

BRANCH OFFICES:

30 Gold St., New York. 139 & 141 Federal St., Boston. 88 Michigan Ave., Chicago.

Pittsburgh Steel Works

ESTABLISHED IN 1845.

ANDERSON & WOODS,

MANUFACTURERS OF

BEST REFINED CAST STEEL,

Cast and German Plow and Spring Steel,

FIRST AVE., AND ROSS ST., PITTSBURGH.

BRANCH HOUSES:

Nos. 74 and 75 North Street, Boston. C. H. WHITNEY & SON, 142 Greenwich Street, New York.
W. F. POTTS SON & CO., 1225 Market Street, Philadelphia.

CHROME STEEL COMPANY,

MANUFACTURERS OF

CHROME CAST STEEL,

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—FOR EVERY PURPOSE.

Works and Offices—Kent Avenue and Keap Street, Brooklyn, E. D., N. Y.

Principal Agencies:

Hall, Kimbark & Co., Chicago, Ills. Harris, Rice & Co., St. Louis, Mo. Horace P. Tobey, Boston, Mass
Cleveland, Brown & Co., Cleveland, Ohio. Wood & Leggat, Hamilton, Ont.

LABELLE STEEL WORKS

REITER, LAVELY & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also, Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.
Post Office Address, Pittsburgh, Pa.

New Jersey Steel and Iron Company.

Trenton, N. J.,

Represented by COOPER, HEWITT & CO., 17 Burling Slip, New York,

MAKERS OF

ROLLED IRON BEAMS.

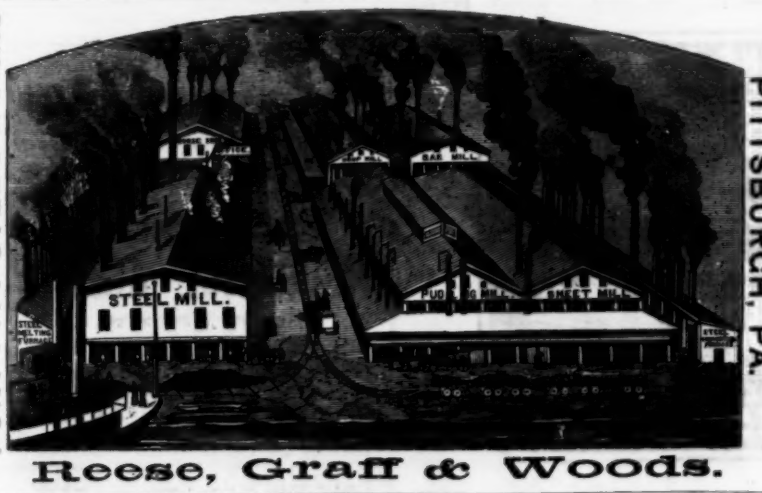
Channel Bars, the Trenton Steel Top Rails, &c., &c. Refined Iron, Braxier and Wire Rods.

ALSO,

THE MARTIN STEEL,

For Machinery Uses and Fire-Box Plates.

FORT PITT STEEL WORKS



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Reese, Graff & Woods.

D. G. GAUTIER & CO.,

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER.

CHICAGO.

(Reported by Markley, Ailing & Co.)

Agricultural Implements.—
Scythes—Dunn Edge Tool Co....dis 25 %
Hay and Manure Forks—Otsego extra C. S....dis 25 %
Hoes and Garden Rakes—Jackson and Otsego...dis 25 %
Scythe Stones....dis 25 %
Scythe and Bush Snathes....dis 20 %
Harvest Rakes and Barley Forks....dis 20 %
Revolving Horse Rakes....dis 20 %
Handles—Fork and Shovel....dis 20 %
Cradles—Nithington, Cooley & Co....dis 20 %
" —Genuine Morgan....₩ doz net $36 00

Augers and Bits.—
Ives' extra C. S....dis 20 % | Snell's....dis 10 %
Jennings'....dis 5 % | " Car Bits....dis 10 %
Cook's....dis 25 % |

Axes.—Amoskeag Yankee....₩ doz $14 00
Amoskeag Crescent.... " 14 50
Hunt's Yankee.... " 14 50
Kennebeck Yankee.... " 12 00
Lippincott " .... " 14 00
" Crown.... " 14 50
" Beveled.... " 14 50
Jefford's Silver Steel.... " 13 00
Red Warrior, Beveled.... " 14 50
Kennebeck, Handled.... " 16 00
Boy's, Handled.... " 12 00

Bolts.—Carriage and Tire....dis 60&20 %
Cast Barrel and Shutter....dis 20&10 %
Wrought Iron Barrel....add 10 %
" " Square....net list

Butts.—Cast Fast Joint, Narrow....dis 10 %
Cast Fast Joint, Broad....dis 20 %
" Loose Joint....dis 40 %
" " Pin, Reversible....dis 35 %
" " Japanned....dis 30 %
" " Silver Tipped....dis 30 %
Wrought Narrow, Fast Joint....dis 20 %
" Broad " ....dis 15 %
" " Loose " ....dis 15 %
" Loose Pin....dis 15 %
" Table....net list
" Brass....dis 10 %
Garretson's Blind Butts, Wood....doz sets $2 00
" " Brick....doz sets 3 00
Parker's " Wood....doz sets 2 25
" " Brick....doz sets 3 25

Casters.—Iron Plate....dis 20 %
Brass Wheel Plate....dis 20 %
Porcelain Wheel Plate....dis 20 %
" " Bed....dis 20 %
Iron Wheel Bed....dis 20 %

Chisels.—Butcher's Tanged Firmer....dis 30 %
" Long Paring....dis 30 %
Witherby Socket Framing....dis 50&15 %
" " Firmer....dis 50&15 %
" " Corner....dis 50&15 %
" " Slicks....dis 50&15 %

Coffee Mills.
Box 4 Iron....$ 3 75 | Box 85 Cast Steel....$13 00
" 103 " .... 5 25 | Side 50.... 4 75
" 102 " .... 6 25 | " 60.... 5 75
" 107 Britannia.... 7 50 | " 70.... 7 25
" 106 " .... 8 50 | " 90.... 18 00
" 25 Union.... 11 00 | " 15 Union.... 7 00
" 35 " .... 13 00 | " 20 " 8 00
" 75 Cast Steel.. 11 00

Cutlery.—American Table....dis 20 %
" Pocket....dis 25 %

Door Springs.—Torry....₩ doz $7 50
Rubber.... " 4 00
Boon's.... " 5 00

Drawing Knives.—Witherby Tool Co....dis 50&15 %
Ohio Tool Co....net list

Files.—Butcher's....$7 00 £
Nicholson's....$5 00 & $5 50 £

Hammers.—
Maydole's....net list | Yerks & Plumb....net list
Cheney....net list

Handles.
Extra Axe...₩ doz. $3 00 | Coal Pick, No. 1..₩ doz $2 00
No. 1 Axe.... " 2 25 | Sledge, No. 1.... " 2 00
No. 2 Axe.... " 2 00 | Hatchet.... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E.... " 65

Hatchets.—
| 1 | 2 | 3
Amoskeag Shingling | $7 25 | $8 00 | $8 75
" Claw | 7 75 | 8 50 | 9 22
" Lath | 7 50 | 8 25 |
" Solid Steel....12 00

Hinges.—Strap and T....dis 20 %
Screw Hook and Strap, 8 to 12 in....net, 10c. ₩ lb
" " 14 to 24 in....net, 9c. ₩ lb
Hook and Eye Hinges....net 12c. @ 16c. ₩ lb
Gate, No. 35, State....₩ doz $3 50
" No. 3, In and Out.... " 3 50
" Blinn's Pat.... " 7 50

Horse Nails.—Northwestern, 8d....24c
Ausable, 8d....24c
Globe, 8d....26c

Kettles.—Brass....50c

Locks and Knobs.—
Norwalk Lock Co. dis 35 % | Enameled....dis 15 %
Branford " dis 35 % | EagleLock Co....dis 15 %
| Am. Pad Locks....dis 25 %
| Cont'al Lock Co....dis 10 %
| Woodruff Patent....net list
| Stowe's Sausage Stuffers....net list
| Enterprise Patent....dis 5 %

Meat Cutters.—
Haven's Patent ...net list
Hale's " ....dis 10 %

Molasses Gates.—
Stebbin's Patent ..dis 40 %

Nails.—10d to 60d....per keg $5 00

Oil Stones.—Washita No. 1....net 35c ₩ lb
Washita Slips....net 65c "
Hindostan No. 1....net 9c "
" Axe....net 10c "
" Slips....net 15c "

Picks and Mattocks.—Picks, Railroad,
Axe Finish....₩ doz $13 50
Picks, Coal, Axe Finish.... " 10 00
Mattocks, L. C., Axe Finish.... " 16 50
" S. C., " .... " 16 00
Grub Hoes, Axe Finish, No. 2.... " 12 00

Planes.—Ohio Tool Co., Bench....dis 15 %
Sciota....dis 20 %
A. Howland & Co., Bench....dis 15 %
" " Fancy....dis 15 %
Bailey Patent Iron....dis 15 %
Plane Irons, Butcher's....dis 30 %

Rivets.—Iron..dis 10 @ 15 % | Copper, No. 7..net, ₩ lb, 60c
Tinned....dis 10 @ 15 %

Rules.—Stanley Rule and Level Co....dis 50&10 %
Hubbard & Curtiss Mfg. Co....dis 50&10 %

Sad Irons.—Best A No. 1....₩ lb, 5 @ 5¼c
" Copper Face Star....₩ lb, 5¼c

Sandpaper.
Wiggin & Stevens, No. 0 to 1½....₩ ream, net, $4 50
" " No. 2 to 3.... " " 5 00

Sash Locks.—Champion....₩ gross, net, $12 00
Hopkins & Dickinson....dis 10 %
Judd's Patent....dis 10 %
Corbin's Patent....dis 10 %
Clark's Patent....dis 20 %

Saws.—H. Disston & Sons....dis 5 %
Champion X Cut....₩ foot, net, 65c
M. A. & Co. X Cut.... " " 55c
Lightning Cut.... " " 70c

Screws.—American Screw Co.—Iron....dis 45 %
American Screw Co.—Brass....dis 50 %
" —Blued Rd. Head....dis 25 %

Shovels and Spades.
Ames' Black Shovels....₩ doz $14 50
" Polished " .... " 15 50
" Patent " .... " 18 00
Ailing " .... " 17 50
" " Molders' .... " 18 00
Crane's Black " .... " 12 00
" Polished " .... " 13 00
Smith's " B. S. L. H. Rd. Pt.... " 13 50
" " B. S. D. H. Rd. Pt.... " 14 00
Ames' Black Spades.... " 16 00
" Polished " .... " 17 00
" Patent " .... " 17 50
Ailing " .... " 15 50
Crane's Black " .... " 12 50
" Polish'd " .... " 13 50

Scoops.—Ailing Steel Polished, No. 2....₩ doz, $14 00
Ailing Steeled Polished, No. 3.... " 14 50
" " No. 4.... " 15 00
" " No. 5.... " 16 00
" " No. 6.... " 17 00
" " No. 7.... " 18 00
" " No. 8.... " 19 00
" " No. 10.... " 22 00
Crane's Polished, No. 5.... " 14 00
" No. 6.... " 15 00
" No. 7.... " 16 00
" No. 8.... " 17 00
Crane's Black Coal, No. 4.... " 18 00
" " No. 5.... " 18 50
Preston, Black Scoops No. 1.... " 12 00
" " No. 2.... " 12 50
" " No. 3.... " 13 00
" Half Pol. Scoops No. 1.... " 13 00
" " No. 2.... " 13 50
" " No. 3.... " 14 00
Lippincott, Half Pol. No. 2.... " 16 00
" " No. 3.... " 17 00

Wrenches.—Taft's....dis 60 %
Coe's Imitation....dis 45 %
Coe's Genuine....dis 25 %

Wringers.—Novelty Clothes Wringer....₩ doz $72 00
Universal Clothes Wringer.... " 72 09
Mead's " " .... " 55 00

Chicago Metal Market.

(Reported by Cragin Bros. & Co., 141, 143, and 145 Lake St.)

Tin Plate.—
IC, 20x14, Coke....$13 50
IC, 10x14, Charcoal. 14 50
IX, 10x14, " 17 50
IC, 12x12, "
IC, 12x12, " 15 00
IX, 12x12, " 18 00
IC, 14x20, "
IC, 14x20, " 15 50
IC, 14x20, Coke Roofing....
IC, 14x20, Charcoal Roofing....
IX, 14x20, "
IC, 20x28, "
IX, 20x28, "

Pig Tin.—
Large, 60 lb....42c

Zinc.—
In casks 1000 lbs....11 c
" 500 " 11½c

Copper.—Copper Bottoms....40c
Sheathing Copper....40c
Planished Copper, 14x48....46c
Size, 14x52, 14x56, 14x60 } Planished Copper....48c
Nos. 7 8 9 }
Braziers' Sheets, 30x 60.—6 to 8 lbs....51c
10 and 12 lbs....48c

Solder.—Extra Fine, C....27c
B. & Co.'s Brand....27c
Fine, No. 1....25c

IX, 14x20, Charcoal.... 18 50
IXX, 14x20, " 21 50
IXXX, 14x20, " 24 50
IXXXX, 14x20, " 27 50
IX, 14x14, " 29 00
DC, 100 Plate, " 14 50
DX, " 17 50
DXX, " 20 50
DXXX, " 28 50

Small, 30 lb....43c
Bar Tin....44c

In sheets....11½c
Slab....9c

Ingot Copper....
Bolt " 50c
Ordinary, No. 2....28c
Plumbers' Solder....25c
Braz'rs' or Spelt'r Solder 45c

Antimony....20c
Babbit Metal....15c. @ 25c.

Galvanized Iron Conductor Pipe....₩ lb 10c

Sheet Iron.—

| Common. | Smooth. | Charcoal.
No. 14 to 24 | 6¼c | 7¼c | 8¼c
25 & 26 | 6¾c | 7¾c | 9 c
27 | 7 c | 7¾c | 9¼c

Add ¼c ₩ lb for 30 in. wide.

Galvanized Iron....dis 20 %

| No. 27....18c
No. 16 to 20....15c | 28....20c
21 to 24....16c |
25 & 26....17c |

Russia Iron.— | Perfect, 11, 12 and 13....20c
Perfect, 9 and 10....22c | In Sheets, 1c. higher.

Lead.— | Lead Pipe, in full coils 10¼c
Pig....8½c | Lead Pipe, when cut.. 11c
Bar....10c | Sheet Lead....10½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage....₩ lb, gold, 13c
Peter Wright's.... " 14½c
Wilkinson's.... " 13½c

Apple Parers.—Conqueror....₩ doz, $9 00
Lightning.... " 9 00
Turn Table.... " 9 00

Augers and Bits.—Cook's....dis 25 %
Ives'....dis 20 %
Jennings'....dis 5 %
Snell's....dis 12½ %

Axes.—Hunt's....₩ doz $14 50 @ 15 50
Lippincott's.... " 14 00 @ 15 00
Lippincott's Pioneer.... " 14 50 @ 15 50
Simmons'.... " 13 50 @ 14 50

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles....dis 10 %
Swelled Taper Axles....dis 10 %
Concord Axles....dis 10 %
Red Jacket Axles....dis 10 %
Common Axles, 1½ inch and upward....₩ lb, 8¼c
" " less than 1½ inch.... " 9¼c

Bells.—Troy, Church....₩ lb, 50c
Light Brass, Hand....dis 50 %
Moore's, Cow....dis 10 %

Bolts.—Arms, Bell & Co.'s Machine....dis 10 %
Arms, Bell & Co.'s Carriage and Tire....dis 60&15 %
Norway Iron Carriage and Tire....dis 45&5 %
Cast Iron Barrel, Shutter, &c....dis 25 %

Cast Butt Hinges.—Narrow Fast Joint....dis 15 %
Broad Fast Joint....dis 30 %
" Loose " ....dis 40 %
Reversible....dis 40 %
" Japanned and Silver Tipped....dis 40 %
Loose Joint " Acorn " " ....dis 35 %
" " Japanned....dis 25 %
Excelsior Reversible Blind....dis 30&10 %
Lull & Porter's Blind....dis 35 %

Wrought Butts.—Narrow....dis 10 %
Reversible....dis 15 %
Broad....dis 15 %
Table Hinges....net list
Back Flaps....net list
Inside Blind Hinges....net list

Casters.—Porcel'n Wheel Bed or Plate..rev. list dis 15 %
Iron or Brass Wheel Bed or Plate....

Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ in.
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32. 10c gold
Trace.... 8¼-10-2 25c "
7-10-2 30c "
German Coil and Halter....new list add 25 % "

American Coil—Short Link.

Size, Inches.... ¼ 7-16 ½ 9-16 ⅝
Price cents ₩ lb.... 12¼ 12¼ 10½ 10 9½ net

Size, Inches.... 11-16 ¾ 13-16 ⅞ 15-16
Price, cents ₩ lb.... 9½ 8¾ 8⅜ 8½ 8¾ net

Size, Inches.... 1 1 1-16 1¼ 1 3-16 1¼
Price, cents, ₩ lb.... 8¼ 8¼ 8 7¾ 7¾ net
All larger sizes same price as 1¼ in. Stud chain 1c less than same size close link.

Chisels.—Socket, Firmer or Framing....dis 55 %

Clothes Wringers.—Colby's....₩ doz $66 00
Novelty.... " 72 00
Universal.... " 72 00
Monitor.... " 72 00

Coffee Mills.—Parker's....net list
P. S. W. & Co.'s....dis 5 %

Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₩ doz $5 75
Disston's.... " 5 75

Crow Bars.—Steel Pointed....₩ lb 8 @ 10c
Solid Cast Steel.... " 20c

Cutlery.—J. Russell & Co.'s.... } new list, dis 15 %
Lamson, Goodnow & Co.'s.... }
Landers, Frary & Clark's.... }

Files and Rasps.—
Nicholson's Mill Files....$5 50 to the £, currency
Nicholson's Other Files.... 5 00 to the £, currency
Butcher's Files.... 7 00 to the £, currency
Heller's Horse Rasps..$10 00 to the £, currency, dis 40 %

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks....dis 25 %
" " Handled Hoes....dis 20 %
" " Planter Eye Hoes....add 20 %
Winsted's Planter Eye Hoes....add 20 %

Hammers.—Yerkes & Plumb....new list net
Masons' Hammers....₩ lb 20c
Smith Hand Hammers.... " 22c

Handles.—Axe.....Extra. No. 1. No. 2. No. 3.
$2 75 $2 25 $1 75 $1 00
Pick.....Extra. No. 1. No. 1½. No. 2.
$2 50 $2 00 $1 75 $1 25
Smith & Montross Fork, Hoe and Rake....dis 10 %
" " Broom and Mop....$12 @ $18 ₩ M.

Harrow Teeth.—1 inch iron....₩ lb 6c
⅞ and ¾ inch iron.... " 6c
⅝ inch iron.... " 6¼c
Barbed or Headed.... ¼c extra

Hatchets.—Hunt's....add 5 %
Simmons'....dis 5 %

Hay Knives.—Lightning....₩ doz $24 00
Dunn Edge Tool Co.'s....₩ doz $14 50—dis 10 %
Fisher's.... " 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make....dis 10 %

Horse Nails.—Eureka....23c rates
Ausable....22c "
Northwestern....23c "
Eagle....19c "
National Patent Pointed....21c "
" " Extra Finished....22c "

Horse Shoes.—R. I. (Perkin's pat.)....₩ keg $7 00
Burden's.... " 7 00
Mule Shoes....$1 00 extra
Rhode Island Trotting Shoes....2 50 "

Locks and Latches.—Jones & Nimick s....dis 33¼ %
Moorhead, Adams & Co....dis 33⅓ %
Norwalk Lock Co.'s revised list....dis 33¼ %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₩ doz. $15 00 @ 16 00
" " Grub Hoes, Oval Eye....₩ doz. 12 00 @ 13 00

Nails.—Wheeling....$5 00 rates.
Orders for 100 kegs 12½c ₩ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₩ doz.$12 00
Klein, Logan & Co.'s Coal.... " 9 75
" " Poll.... " 12 00
" " Stone.... " 16 50
" " Tamping.... " 19 00

Planes.—Ohio Tool Co.'s....net list
Eastern....dis 5 %

Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32....dis 20 %
Barton's Patent....₩ doz $25—dis 20 %
Vaughn's " " 25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished....₩ lb 6c

Sash Weights.—Standard Solid Eyes....₩ lb 3½c

Saws.—Disston's....dis 5 %
Spear & Jackson's....$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s....dis 10 %
Branch, Crooks & Co.'s....dis 10 %
Livingston's Patent Back....net list

Screws.—American Screw Co.'s revised list...dis 42½ %
$2000 worth in 6 months.... 2½ % extra

Scythes.—Blood's C. S. & G. S....net list
Dunn Edge Tool Co.'s, Factory List....dis 15 %
Paris Furnace Co.'s....dis 20 %
Waldron's English....$10 00 to £

Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00 } dis 25 %
Extra Indian Pond.... " 7 50 }
Premium.... " 9 50 }
Diamond Grit.... " 13 50 }

Shovels, Spades and Scoops.—Ames'..add $1 to list
Lippincott's....new list net
Rowland's, Maxwell....revised list net

Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished....₩ lb, 17c
Solid Cast Steel.... " 25c
Striking Sledges....₩ lb extra, 1c

Smiths and Cradles....dis 20 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express....dis 5 %
Blue Seat Springs....new list dis 10 %

Tacks.—Norway Tack Co.'s ½ weight....dis 62½ %
Brads....dis 50 %

Traps.—Newhouse Patent....dis 12½ %
Reichard's Animal, Wood Bottom....₩ doz $10 00
" " Metal Bottom.... " 12 00

Vises.—Solid Box....₩ lb 18c
Wilson Mfg. Co.'s....dis 15 %

Wrenches.—Coes' Genuine....dis 25 %
Coes' Pattern....dis 40 %
Taft's....dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.
IC, 10x14, Charcoal....$14 50
IX, 10x14, " 17 50
IC, 12x12, " 15 00
IX, 12x12, " 18 00
IC, 14x20, " 15 50
IX, 14x20, " 18 50
IC, 14x20, Terne.... 14 00
IX, 14x20, " 17 00
IC, 20x28, " 29 00

IX, 20x28, Terne....$34 00
IC, continuous, 20 in. x 200 ft.... 27 00
IX, continuous, 20 in. x 200 ft.... 34 00
IC, 10x14, best Coke.. 13 50
IC, 10x14, good " 13 00
IC, 10x20.... 21 00
IC, 14x20.... 13 50

Block Tin.
Large Pigs....42c
Small " 43c

Bars....44c

Sheet Zinc.
Casks....₩ lb 11c | Sheet....₩ lb 11¼c

Solder.
No. 1, Refined, in bars or plate....25c
No. 2, " " " 23c
Pig Lead....8½c

Sheet Copper.—18 to 100 lbs. Sheets 30x60....42c
14 to 16 lbs., Sheets 30x60.... " 42c
10 to 12 lbs., " and 20x72.... " 45c
6 to 9 lbs., " .... " 48c

Tinned, 14 and 16 oz. 14x48....38c
Planished, 14 and 16 oz. 14x48....46c
" No. 7, 8 and 9....48c
Copper Bottoms....45c

Sheet Iron.—

| Com'n. | Sm'th. | Char'l. | Jun
No. 16 to 20.... | 6½c | 7½c | 8¾c |
No. 22 to 24.... | 6½c | 7½c | 8¾c |
No. 26.... | 6¾c | 7¾c | 9c | 11¼c
No. 27.... | 7c | 8c | 9¼c | 11½c

Galvanized Iron....dis 20 %
Iron Rivets....dis 15&20 %
Iron Wire....dis 15 %
Coppered Pail Bail Wire....dis 5 %
Copper Rivets and Burs....dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₩ lb....21c
No. 1, stained, ₩ lb....20c
Imitation Russia, ₩ lb....15

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal
IC, 10x14....$13 75
IX, 10x14.... 16 50
XX, 10x14.... 19 25
IC, 12x12.... 14 25
IX, 12x12.... 17 00
IC, 14x20.... 14 75
IX, 14x20.... 17 50
XX, 14x20.... 20 25
XXX, 14x20.... 23 00
XXXX, 14x20.... 25 75
DC, 100 Plate.... 13 25
DX, " 16 00
DXX, " 18 75
DXXX " 21 50
DXXXX 100 Plate.. 24 25
IX, 14x14.... 25 25
IC, 10x14 W.... 13 25
IX, 10x14 W.... 16 00

Roofing Tin.—Best Char.
IC, Terne, 14x20....$12 75
IX, " 14x20.... 15 50
IC, Terne, 20x28.... 27 00
IX, " 20x28.... 31 00

Coke Tin.—
IC, 10x14 Coke....$12 75
IX, 10x14, Coke 15 50
IC, 14x20, " 13 75

Sheet Zinc.—Any width....11c

Copper.—
Sheathing....38c
Copper Bottoms....40c

Planished Copper.—
Sheathing, 14x48....46c
Boiler Size, No. 7....48c
" " No. 8....48c
" " No. 9....48c

Pig Tin.—
Large Pigs....40c
Small Pigs....41c
Bars....42c

Solder.—No. 1....22 c
No. 2....20c

Bright Wire....dis 25 %

Sheet Iron.—
No. 18 Am. Com....6¼c
No. 24 Am. Com....6½c
Pat. Am. Russia "A,"
Nos. 24, 25 & 26....14c
Russia No. 9, 10, 11 & 12. 21½c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $7 25
" 21 to 24.... 7 45
" 25 & 26.... 7 65
" 21 to 24 Char'l.. 8 95
" 25 & 26 " 9 15

Sheet Zinc.—Any width....11c

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers of Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal....$14 00 @ $15 00
I. C. 10x14 best Coke.... 13 00 @ 14 00
I. C. Terne, 14-20.... 12 50 @ 13 50
I. C. " 20-28.... 26 00 @ 28 00
I. C. Continuous.... 28 00

Pig Tin.—
Banca....₩ lb 47c

Solder.—
S. & Co....₩ lb 28c

Lead.—Pig..₩ lb 7¼c @ 8c.

Copper.—
Ingot....₩ lb 31c @ 33c | Brazier, 6 to 9 lb...₩ lb 46c
Planished.... " 51c @ 53c | " 10 to 14 lb.... " 43c
Sheathing.. " 44c @ 46c | " 14 to 100 lb.. " 40c
Bolt.... " 40c | Copper Bottoms.... " 45c

Zinc.—Cask, 500 to 1000 lbs....₩ lb 11¼c
Case, 100 lbs.... " 11¾c
Slab.... " 8½c @ 9c

Brass.—
Roll, No. 6 to 30.₩ lb 45c | Roll, No. 38 to 40.. ₩ lb 50c
" 30 to 38. " 46c | Wire, No. 0 to 20.. ₩ lb 50c
" 20 to 25.... " 60c

Babbit Metal.— | Black Lead....₩ lb 25c
Sellew & Co....₩ lb 35c | Market.... " 15c

Antimony....₩ lb 22c
Bismuth....₩ lb $6 00
Nickel....₩ lb $3 50

Pig Iron.—
HOT BLAST CHARCOAL PIG.
Hanging Rock, No. 1....$55 00 @ $
" " No. 2.... 52 00 @ 53 00
" " Forge.... 45 00 @ 46 00
Tennessee, No. 1.... 54 00 @ 55 00
" Forge.... 44 00 @ 45 00
Alabama, No. 1.... 55 00 @
Missouri, No. 1.... 55 00 @
" No. 2.... 53 00 @ 54 00

HOT BLAST STONE COAL PIG.
Missouri, No. 1....$55 00 @ $
" Forge.... 43 00 @ 44 00
Ohio, No. 1.... 53 00 @ 54 00
" Forge.... 43 00 @ 44 00
Scotch Pig, No. 1....

COAL BLAST CHARCOAL.
Hanging Rock, Car Wheel....$62 00 @ $67 00
Missouri, Car Wheel.... 60 00 @ 62 00
Red River, " .... 60 00 @
Tennessee, " .... 60 00 @ 62 00
Alabama, " .... 60 00 @ 62 00
Blooms.... 115 00 @ 120 00

Sheet Iron.— | Am Russia A..₩ lb 14 @ 15c
Russia....₩ lb 20c @ 22c | " B.. " 13 @ 14c

| Smooth | Smooth
| Com. B. | Fin. S. L. U. | D. Re'fd.
15 to 20.... | 6·0c | 7·5c | 9·0c
22 to 24.... | 6·2c | 7·8c | 9·2c
26.... | 6·4c | 8·0c | 9·4c
27.... | 6·6c | 8·2c | 9·6c

Galvanized Iron.—Full bundles....dis 20 %
Nos. 18 to 20.... | 15c | No. 27....18c
22 to 24.... | 16c | 28....20c
25 to 26.... | 17c |

Bar Steel.—Silver, ₩ lb 21c; Crescent, 17½c.
Iron Wire....dis 15 %
Enameled Ware....dis 33⅓ %

One Piece Corrugated Elbows.—

| Charcoal Iron. | | Russia Iron.
4½ Inch.... | ₩ doz $3 75 | 4½ inch.... | ₩ doz $8 00
5 " .... " 4 75 | 5 " .... " 10 00
5½ " .... " 5 25 | 5½ " .... " 12 00
6 " .... " 5 25 | 6 " .... " 13 00
7 " .... " 6 50 | 7 " .... " 14 00

Leader Elbows—Flat Crimp Retinned.—

| ₩ doz. | | ₩ doz.
2-inch....$2 00 | 2½-inch.... | $2 25
2-inch.... 2 50 | 3½-inch.... | 3 00
4-inch.... 3 50 | 4½-inch.... | 4 00

Sheet Iron Bread Pans....₩ lb 13c
American Broilers....₩ doz, $13 50
Tinmen's Machines....net list
Sad Irons....₩ lb, 5½c
Brass Kettles.—Ansonia....48c
Wrought Iron Pipe....dis 60 %

| Inside Diameter, Inches. | ⅛ | ¼ | ⅜ | ½ | ¾ | 1 | 1¼
Price, ₩ foot.... | 10 | 10 | 12 | 15 | 20 | 29 | 39
Weights of Pipe, ₩ foot. | 24 | 42 | 56 | 85 | 1·12 | 1·67 | 2·25
Inside Diameter, Inches. | 1½ | 2 | 2½ | 3 | 3½ | 4 |
Price, ₩ foot.... | 50 | 70 | 1·10 | 1·50 | 1·85 | 2·3 |
Weights of Pipe, ₩ foot. | 2·69 | 3·66 | 5·77 | 7·54 | 9·05 | 10· |

London Metal Market.

(From The Mining Journal.)

| £. | s. | d. | £. | s. | d.
Copper—₩ ton.
Best Selected.... | 96 | 0 | 0 | 100 | 0 | 0
Tough Cake & Tile.... | 92 | 0 | 0 | 95 | 0 | 0
Sheathing and Sheets.... | 98 | 0 | 0 | 105 | 0 | 0
Bolts.... | 100 | 0 | 0 | 108 | 0 | 0
Bottoms.... | 100 | 0 | 0 | 107 | 0 | 0
Old (Exchange).... | 84 | 0 | 0 | — | — | —
Burra Burra.... | 90 | 0 | 0 | 91 | 0 | 0
Wire.... ₩ lb. | 0 | 1 | 1½ | — | — | —
Tubes.... " | 0 | 1 | 0¾ | 0 | 1 | 1
Brass—₩ lb.
Sheets.... | 0 | 0 | 10 | 0 | 0 | 10½
Wire.... | 0 | 0 | 10¾ | — | — | —
Tubes.... | 0 | 0 | 11¼ | 0 | 0 | 11½
Yellow Metal Sheathing.... | 0 | 0 | 9 | 0 | 0 | 9¾
Sheets.... | 0 | 0 | 8¾ | 0 | 0 | 9¼
Tin—₩ ton.
English Blocks.... | 134 | 0 | 0 | 135 | 0 | 0
Ditto Bars.... | 135 | 0 | 0 | 136 | 0 | 0
Ditto Refined.... | 137 | 0 | 0 | 0 | 0 | 0
Banca.... | 136 | 0 | 0 | 137 | 0 | 0
Straits.... | 134 | 0 | 0 | — | — | —
Tin Plates—† ₩ box.
IC Charcoal.... 1 qual. | 2 | 2 | 0 | 2 | 5 | 0
IX " .... 1 qual. | 2 | 8 | 0 | 2 | 11 | 0
IC " .... 2 qual. | 1 | 18 | 0 | 2 | 2 | 0
IX " .... 2 qual. | 2 | 3 | 0 | 2 | 8 | 0
IC Coke.... | 1 | 14 | 0 | 1 | 16 | 0
IX " .... | 2 | 0 | 0 | 2 | 3 | 0
Canada Plates....₩ ton. | 24 | 10 | 0 | 26 | 0 | 0
" at works.... | 24 | 0 | 0 | 25 | 0 | 0
Spelter—₩ ton.
Foreign.... | 27 | 10 | 0 | 28 | 0 | 0
To arrive.... | | — | | — | |
Zinc—₩ ton.
In Sheets.... | 33 | 0 | 0 | 33 | 10 | 0
Iron—₩ ton.
Bars Welsh, in London.... | 12 | 12 | 0 | 13 | 0 | 0
" to arrive.... | 12 | 10 | 0 | 13 | 0 | 0
Nail Rods.... | 13 | 12 | 6 | 13 | 15 | 0
Nail Rods, Staff'd in L'ndon | 14 | 0 | 0 | 15 | 0 | 0
Bars.... | 14 | 5 | 0 | 16 | 10 | 0
Hoops.... | 15 | 0 | 0 | 17 | 0 | 0
Bars at Works.... | 13 | 5 | 0 | 15 | 0 | 0
Hoops ditto.... | 14 | 0 | 0 | 16 | 0 | 0
Sheets, single.... | 17 | 0 | 0 | 18 | 0 | 0
Pig, No. 1, in Wales.... | 5 | 10 | 0 | 7 | 0 | 0
Refined metal ditto.... | 7 | 0 | 0 | 8 | 0 | 0
Bars, common, ditto.... | 13 | 10 | 0 | 15 | 0 | 0
Do, merchant, Tyne or Tees | 12 | 15 | 0 | 13 | 0 | 0
Ditto, Railway, in Wales.... | 11 | 10 | 0 | 13 | 0 | 0
Ditto, Swedish, in London. | 18 | 0 | 0 | 19 | 0 | 0
To arrive.... | 20 | 0 | 0 | 21 | 0 | 0
Pig, No. 1, in Clyde.... | 5 | 12 | 6 | 7 | 0 | 0
Ditto, f.o.b., Tyne or Tees. | 4 | 10 | 0 | 5 | 10 | 0
Ditto, Nos. 3, 4, f.o.b.... | | — | | — | |
Railway Chairs.... | 5 | 5 | 0 | 6 | 0 | 0
" Spikes.... | 12 | 10 | 0 | 14 | 0 | 0
Indian Ch'coal Pigs in L'don | 10 | 0 | 0 | 12 | 0 | 0
Steel—₩ ton.
Swedish, in kegs (rolled).... | | — | | — | |
Ditto (hammered).... | 20 | 0 | 0 | 22 | 0 | 0
Ditto, in faggots.... | | — | | — | |
English, spring.... | 23 | 0 | 0 | 26 | 0 | 0
Quicksilver—₩ bottle. | 13 | 15 | 0 | 14 | 0 | 0
Lead—₩ ton.
English Pig,

Steel.

THREE 1st CLASS PRIZE MEDALS. CLASSES 1, 21, 22, Great Exhibition of Industry, LONDON, 1851.

MEDAL OF HONOUR, SOCIETY OF ARTS & INDUSTRY, LONDON, 1856.

1st CLASS PRIZE MEDAL, CLASS 1st UNIVERSAL EXHIBITION OF INDUSTRY PARIS, 1855.

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SUCCESSORS TO

SAML. COCKER & SON,

(Established 1752.)

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BEST CAST STEEL WIRE, ADAPTED SPECIALLY FOR MECHANICAL PURPOSES;
Also for ROPES, NEEDLES, FISH HOOKS, PINS, CRINOLINE, &c.

BEST CAST STEEL FILES, SAWS, EDGE TOOLS,
HACKLES, GILLS, CARD CLOTHING, CARD TEETH, HACKLE AND GILL PINS,
FISH HOOKS, NEEDLES. &c.

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CHICAGO, Crerar, Adams & Co.....ST. LOUIS, Henry Bakewell & Sons.
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WARRANTED CAST STEEL, especially adapted for DIES and TURNING TOOLS, DRILLS, COLD CHISELS, PUNCHES and all kinds of MACHINISTS' TOOLS.
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Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.
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Axles, Shafting, Boiler & Ship Plates, Bessemer Pig Iron, etc., etc.

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DOG BRAND FILES,

Unsurpassed, if equaled, in quality.

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In calling the attention of consumers of Steel in any of the parishes above enumerated, we would respectfully assure them of our ability to supply an article, that cannot be excelled in quality, temper, and adaptation in all respects to the various purposes for which it may be required. Half a century of practical experience in all departments of Steel manufacture, a long established reputation in England, and the Continent of Europe, and in the United States principally of this Country, encourage us to solicit a unprejudiced trial of our Steel for the above or other purposes for which a first class material in quality, temper, and durability is needed.

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Reaper Bars, Crow Bars, &c., &c.

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TIRE, TOE CORK, SLEIGH SHOE, BLISTER & PLOW STEEL.

Also, Plow and other Iron.

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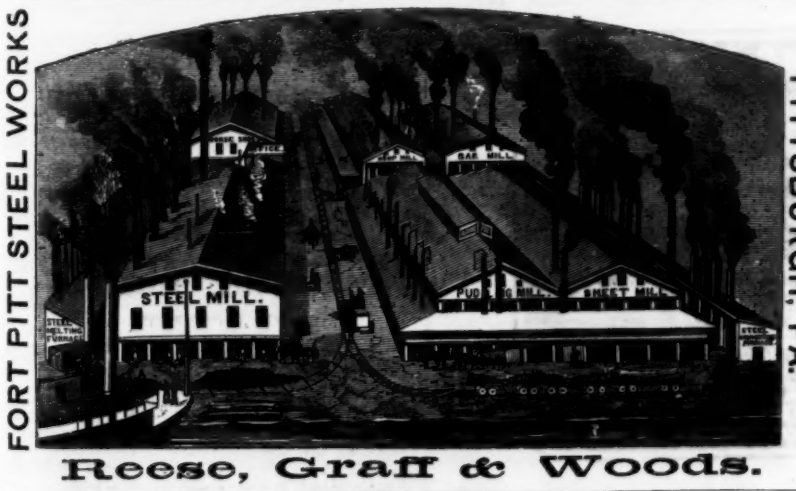

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Agricultural Implements.—
Scythes—Dunn Edge Tool Co.....dis 25 %
Hay and Manure Forks—Otsego extra C. S.....dis 25 %
Hoes and Garden Rakes—Jackson and Otsego.....dis 25 %
Scythe Stones.....dis 25 %
Scythe and Bush Snathes.....dis 20 %
Harvest Rakes and Barley Forks.....dis 20 %
Revolving Horse Rakes.....dis 20 %
Handles—Fork and Shovel.....dis 20 %
Cradles—Nithington, Cooley & Co.....dis 20 %
" —Genuine Morgan.....₱ doz net $36 00

Augers and Bits.—
Ives' extra C. S.....dis 20 % | Snell's.....dis 10 %
Jennings'.....dis 5 % | " Car Bits.....dis 10 %
Cook's.....dis 25 %

Axes.—Amoskeag Yankee.....₱ doz $14 00
Amoskeag Crescent....." 14 50
Hunt's Yankee....." 14 50
Kenbeck Yankee....." 12 00
Lippincott " ....." 14 00
" Crown....." 14 50
" Beveled....." 14 50
Jefford's Silver Steel....." 13 00
Red Warrior, Beveled....." 14 50
Kennebeck, Handled....." 16 00
Boy's, Handled....." 12 00

Bolts.—Carriage and Tire.....dis 60&20 %
Cast Barrel and Shutter.....dis 20&10 %
Wrought Iron Barrel.....add 10 %
" " Square.....net list

Butts.—Cast Fast Joint, Narrow.....dis 10 %
Cast Fast Joint, Broad.....dis 20 %
" Loose Joint.....dis 40 %
" " Pin, Reversible.....dis 35 %
" " Japanned.....dis 30 %
" " Silver Tipped.....dis 30 %
Wrought Narrow, Fast Joint.....dis 20 %
" Broad " " .....dis 15 %
" " Loose " .....dis 15 %
" Loose Pin.....dis 15 %
" Table.....net list
" Brass.....dis 10 %
Garretson's Blind Butts, Wood.....doz sets $2 00
" " Brick.....doz sets 3 00
Parker's " Wood.....doz sets 2 25
" " Brick.....doz sets 3 25

Casters.—Iron Plate.....dis 20 %
Brass Wheel Plate.....dis 20 %
Porcelain Wheel Plate.....dis 20 %
" " Bed.....dis 20 %
Iron Wheel Bed.....dis 20 %

Chisels.—Butcher's Tanged Firmer.....dis 30 %
" " Long Paring.....dis 30 %
Witherby Socket Framing.....dis 50&15 %
" " Firmer.....dis 50&15 %
" " Corner.....dis 50&15 %
" " Slicks.....dis 50&15 %

Coffee Mills.
Box 4 Iron.....$ 3 75 | Box 85 Cast Steel.....$13 00
" 108 " .....5 25 | Side 50.....4 75
" 102 " .....6 25 | " 60.....5 75
" 107 Britannia.....7 50 | " 70.....7 25
" 106 " .....8 50 | " 90.....18 00
" 25 Union.....11 00 | " 15 Union.....7 00
" 35 " .....13 00 | " 20 " 8 00
" 75 Cast Steel..11 00

Cutlery.—American Table.....dis 20 %
" Pocket.....dis 25 %

Door Springs.—Torry.....₱ doz $7 50
Rubber....." 4 00
Boon's....." 5 00

Drawing Knives.—Witherby Tool Co.....dis 50&15 %
Ohio Tool Co.....net list

Files.—Butcher's.....$7 00 £
Nicholson's.....$5 00 @ $5 50 £

Hammers.—
Maydole's.....net list | Yerks & Plumb.....net list
| Cheney.....net list

Handles.
Extra Axe...₱ doz. $3 00 | Coal Pick, No. 1..₱ doz $2 00
No. 1 Axe.... " 2 25 | Sledge, No. 1.... " 2 00
No. 2 Axe.... " 2 00 | Hatchet.... " 65
R.R. Pick, No. 1 " 2 00 | Hammer, A. E.... " 65

Hatchets.—
| 1 | 2 | 3
Amoskeag Shingling | $7 25 | $8 00 | $8 75
" Claw | 7 75 | 8 50 | 9 22
" Lath | 7 50 | 8 25 |
" " Solid Steel | | | 12 00

Hinges.—Strap and T.....dis 20 %
Screw Hook and Strap, 8 to 12 in.....net, 10c. ₱ lb
" " 14 to 24 in.....net, 9c. ₱ lb
Hook and Eye Hinges.....net 12c. @ 16c. ₱ lb
Gate, No. 35, State.....₱ doz $3 50
" No. 3, In and Out....." 3 50
" Blinn's Pat....." 7 50

Horse Nails.—Northwestern, 8d.....24c
Ausable, 8d.....24c
Globe, 8d.....26c

Kettles.—Brass.....50c | Enameled.....dis 15 %

Locks and Knobs.—Eagle Lock Co.....dis 15 %
Norwalk Lock Co. dis 35 % | Am. Pad Locks.....dis 25 %
Branford " .dis 35 % | Cont'al Lock Co. ..dis 10 %
Woodruff Patent ...net list

Meat Cutters.—Stowe's Sausage Stuffers.....net list
Haven's Patent ...net list | Enterprise Patent...dis 5 %
Hale's " ...dis 10 %

Molasses Gates.—
Stebbin's Patent ..dis 40 %

Nails.—10d to 60d.....per keg $5 00

Oil Stones.—Washita No. 1.....net 35c ₱ lb
Washita Slips.....net 65c "
Hindostan No. 1.....net 9c "
" Axe.....net 10c "
" Slips.....net 15c "

Picks and Mattocks.—Picks, Railroad, Axe Finish.....₱ doz $13 50
Picks, Coal, Axe Finish.....10 00
Mattocks, L. C., Axe Finish.....16 50
" E. C., " " 16 00
Grub Hoes, Axe Finish, No. 2.....12 00

Planes.—Ohio Tool Co., Bench.....dis 15 %
Sciota.....dis 20 %
A. Howland & Co., Bench.....dis 15 %
" " Fancy.....dis 15 %
Bailey Patent Iron.....dis 15 %
Plane Irons, Butcher's.....dis 30 %

Rivets.—Iron.dis 10 @ 15 % | Copper, No. 7.net, ₱ lb, 60c
Tinned.....dis 10 @ 15 %

Rules.—Stanley Rule and Level Co.....dis 50&10 %
Hubbard & Curtiss Mfg. Co.....dis 50&10 %

Sad Irons.—Best A No. 1.....₱ lb, 5 @ 5½c
" Copper Face Star.....₱ lb, 5½c

Sandpaper.
Wiggin & Stevens, No. 0 to 1½.....₱ ream, net, $4 50
" " No. 2 to 3....." 5 00

Sash Locks.—Champion.....₱ gross, net, $12 00
Hopkins & Dickinson.....dis 10 %
Judd's Patent.....dis 10 %
Corbin's Patent.....dis 10 %
Clark's Patent.....dis 20 %

Saws.—H. Disston & Sons.....dis 5 %
Champion X Cut.....₱ foot, net, 55c
M. A. & Co. X Cut....." " 55c
Lightning Cut....." " 70c

Screws.—American Screw Co.—Iron.....dis 45 %
American Screw Co.—Brass.....dis 50 %
" —Blued Rd. Head.....dis 25 %

Shovels and Spades.
Ames' Black Shovels.....₱ doz $14 50
" Polished " ....." 15 50
" Patent " ....." 18 00
Alling " ....." 17 50
" " Molders'....." 18 00
Crane's Black " ....." 12 00
" Polished " ....." 13 00
Smith's " B. S. L. H. Rd. Pt....." 13 50
" " B. S. D. H. Rd. Pt....." 14 00
Ames' Black Spades....." 16 00
" Polished " ....." 17 00
" Patent " ....." 17 50
Alling " ....." 15 50
Crane's Black " ....." 12 50
" Polish'd " ....." 13 50

Scoops.—Alling Steel Polished, No. 3.....₱ doz, $14 00
Alling Steeled Polished, No. 3....." 14 50
" " No. 4....." 15 00
" " No. 5....." 16 00
" " No. 6....." 17 00
" " No. 7....." 18 00
" " No. 8....." 19 00
" " No. 10....." 22 00
Crane's Polished, No. 5....." 14 00
" No. 6....." 15 00
" No. 7....." 16 00
" No. 8....." 17 00
Crane's Black Coal, No. 4....." 18 00
" " No. 5....." 18 50
Preston, Black Scoops No. 1....." 12 00
" " No. 2....." 12 50
" " No. 3....." 13 00
" Half Pol. Scoops No. 1....." 13 00
" " No. 2....." 13 50
" " No. 3....." 14 00
Lippincott, Half Pol. No. 2....." 16 00
" " No. 3....." 17 00

Wrenches.—Taft's.....dis 60 %
Coe's Imitation.....dis 45 %
Coe's Genuine.....dis 25 %

Wringers.—Novelty Clothes Wringer.....₱ doz $72 00
Universal Clothes Wringer....." 72 00
Mead's " " ....." 55 00

Chicago Metal Market.

(Reported by Cragin Bros. & Co., 141, 143, and 145 Lake St.)

Tin Plate.—
IC, 20x14, Coke.....$13 50 | IX, 14x20, Charcoal.....18 50
IC, 10x14, Charcoal. 14 50 | IXX, 14x20, " 21 50
IX, 10x14, " . 17 50 | IXXX, 14x20, " 24 50
IC, 12x12, " | IXXXX, 14x20, " 27 50
IC, 12x13, " . 15 00 | IX, 14x14, " 20 00
IX, 12x12, " . 18 00 | DC, 100 Plate, " 14 50
IC, 14x20, " | DX, " 17 50
IC, 14x20, " . 15 50 | DXX, " 20 50
IC, 14x20, Coke Roofing | DXXX, " 23 50
IC, 14x20, Charcoal Roofing.....14 00
IX, 14x20, " 17 00
IC, 20x28, " 20 00
IX, 20x28, " 24 00

Pig Tin.— | Small, 30 lb.....43c
Large, 60 lb.....42c | Bar Tin.....44c

Zinc.—
In casks 1000 lbs.....11 c | In sheets.....11¼c
" 500 " .....11¼c | Slab.....9c

Copper.—Copper Bottoms.....40c
Sheathing Copper.....40c
Planished Copper, 14x48.....46c
Size, 14x52, 14x56, 14x60 | Planished Copper.....48c
Nos. 7 8 9

Brazier's Sheets, 30x60.—6 to 8 lbs.....51c | 15 to 100 lbs.....45c
10 and 12 lbs.....48c | Ingot Copper.....
| Bolt " 50c

Solder.—Extra Fine, C. B. & Co.'s Brand.....37c | Ordinary, No. 2.....28c
Fine, No. 1.....28c | Plumbers' Solder.....28c
| Braz'r'g or Spelt'r Solder 45c

Antimony......30c

Babbit Metal......15c. @ 25c.

Galvanized Iron Conductor Pipe......₱ lb 10c

Sheet Iron.—

| Common. | Smooth. | Charcoal.
No. 14 to 24..... | 6¾c | 7¼c | 8¾c
" 25 & 26..... | 6¾c | 7½c | 9 c
" 27..... | 7 c | 7¾c | 9¼c

Add ¼c ₱ lb for 30 in. wide.

Galvanized Iron......dis 20 %

| No. 27..... | 18c
No. 16 to 20.....15c | 28..... | 20c
21 to 24.....16c |
25 & 26.....17c |

Russia Iron.— | Perfect, 11, 12 and 13.....20c
Perfect, 9 and 10.....22c | In Sheets, 1c. higher.

Lead.— | Lead Pipe, in full coils 10½c
Pig.....8½c | Lead Pipe, when cut..11c
Bar.....10c | Sheet Lead.....10½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Anvils.—Armitage.....₱ lb, gold, 13c
Peter Wright's....." 14½c
Wilkinson's....." 12½c

Apple Parers.—Conqueror.....₱ doz, $9 00
Lightning....." 9 00
Turn Table....." 9 00

Augers and Bits.—Cook's.....dis 25 %
Ives'.....dis 20 %
Jennings'.....dis 5 %
Snell's.....dis 12½ %

Axes.—Hunt's.....₱ doz $14 50 @ 15 50
Lippincott's....." 14 00 @ 15 00
Lippincott's Pioneer....." 14 50 @ 15 50
Simmons'....." 13 50 @ 14 50

Axles.—Kritch & Crane Mfg. Co.'s—
Patent Taper Axles.....dis 10 %
Swelled Taper Axles.....dis 10 %
Concord Axles.....dis 10 %
Red Jacket Axles.....dis 10 %
Common Axles, 1½ inch and upward.....₱ lb, 8½c
" " less than 1½ inch....." 9½c

Bells.—Troy, Church.....₱ lb, 50c
Light Brass, Hand.....dis 50 %
Moore's, Cow.....dis 10 %

Bolts.—Arms, Bell & Co.'s Machine.....dis 10 %
Arms, Bell & Co.'s Carriage and Tire.....dis 60&15 %
Norway Iron Carriage and Tire.....dis 45&5 %
Cast Iron Barrel, Shutter, &c.....dis 25 %

Cast Butt Hinges.—Narrow Fast Joint.....dis 15 %
Broad Fast Joint.....dis 30 %
" Loose " .....dis 40 %
Reversible.....dis 40 %
" Japanned and Silver Tipped.....dis 40 %
Loose Joint "Acorn" " " .....dis 35 %
" " Japanned.....dis 25 %
Excelsior Reversible Blind.....dis 30&10 %
Lull & Porter's Blind.....dis 35 %

Wrought Butts.—Narrow.....dis 10 %
Reversible.....dis 15 %
Broad.....dis 15 %
Table Hinges.....net list
Back Flaps.....net list
Inside Blind Hinges.....net list

Casters.—Porcel'n Wheel Bed or Plate..rev. list dis 15 %
Iron or Brass Wheel Bed or Plate.....

Chain.—Eng. Coil..3-16 ¼ 5-16 ⅜ 7-16 ½ in.
15 12½ 11¾ 11 10½ 10c gold
Trace.....6½-10-2 75c "
4-10-2 80c "
German Coil and Halter.....new list add 25 % "

American Coil—Short Link.

Size, inches..... ⅜ 7-16 ½ 9-16 ⅝
Price cents ₱ lb..... 12¾ 12½ 10½ 10 9½ net
Size, inches.....11-16 ¾ 13-16 ⅞ 15-16
Price, cents ₱ lb.....9½ 8¾ 8⅜ 8½ 8⅜ net
Size, inches..... 1 1 1-16 1⅛ 1 3-16 1¼
Price, cents..... 8¼ 8½ 8 7¾ 7½ net
All larger sizes same price as 1¼ in. Stud chain 1c less than same size close link.

Chisels.—Socket, Firmer or Framing.....dis 55 %

Clothes Wringers.—Colby's.....₱ doz $66 00
Novelty....." 72 00
Universal....." 72 00
Monitor....." 72 00

Coffee Mills.—Parker's.....net list
P. S. W. & Co.'s.....dis 5 %

Corn Knives.—Dunn E'ge T'ol Co.'s Clip..₱ doz $5 75
Disston's....." 5 75

Crow Bars.—Steel Pointed.....₱ lb 8 @ 10c
Solid Cast Steel.....20c

Cutlery.—J. Russell & Co.'s.....
Lamson, Goodnow & Co.'s..... } new list, dis 15 %
Landers, Frary & Clark's.....

Files and Rasps.—
Nicholson's Mill Files.....$5 50 to the £, currency
Nicholson's Other Files.....5 00 to the £, currency
Butcher's Files.....7 00 to the £, currency
Heller's Horse Rasps..$10 00 to the £, currency, dis 40 %

Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 25 %
" " Handled Hoes.....dis 20 %
" " Planter Eye Hoes.....add 20 %
Winsted's Planter Eye Hoes.....add 20 %

Hammers.—Yerkes & Plumb.....new list net
Mason' Hammers.....₱ lb 20c
Smith Hand Hammers.....22c

Handles.—Axe.....Extra. $2 75 | No. 1. $2 25 | No. 2. $1 75 | No. 3. $1 00
Pick.....Extra. $2 50 | No. 1. $2 00 | No. 1½. $1 75 | No. 2. $1 25
Smith & Montross Fork, Hoe and Rake.....dis 10 %
" " Broom and Mop.....$12 @ $18 ₱ M.

Harrow Teeth.—1 inch iron.....₱ lb 6c
⅞ and ¾ inch iron....." 6c
⅝ inch iron....." 6¼c
Barbed or Headed.....¾c extra

Hatchets.—Hunt's.....add 5 %
Simmons'.....dis 5 %

Hay Knives.—Lightning.....₱ doz $24 00
Dunn Edge Tool Co.'s.....₱ doz $14 50—dis 10 %
Fisher's....." 16 50—dis 10 %

Hinges.—Strap and T—St. Louis make.....dis 10 %

Horse Nails.—Eureka.....23c rates
Ausable.....22c "
Northwestern.....22c "
Eagle.....19c "
National Patent Pointed.....21c "
" " " Extra Finished.....22c "

Horse Shoes.—R. I. (Perkin's pat.).....₱ keg $7 00
Burden's....." 7 00
Mule Shoes.....$1 00 extra
Rhode Island Trotting Shoes.....2 50 "

Locks and Latches.—Jones & Nimick s....dis 33⅓ %
Moorhead, Adams & Co.....dis 33⅓ %
Norwalk Lock Co.'s revised list.....dis 33⅓ %

Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks....₱ doz. $15 00 @ 16 00
" " Grub Hoes, Oval Eye....₱ doz. 12 00 @ 13 00

Nails.—Wheeling.....$5 00 rates.
Orders for 100 kegs 12¼c ₱ keg less.

Picks.—Klein, Logan & Co.'s R. R. and Clay ₱ doz.$12 00
Klein, Logan & Co.'s Coal....." 9 75
" " " Poll....." 12 00
" " " Stone....." 16 50
" " " Tamping....." 19 00

Planes.—Ohio Tool Co.'s.....net list
Eastern.....dis 5 %

Post Hole Augers.—Clark's Patent—
No. 1, ₱ doz. $27; No. 2, $30; No. 3, $32.....dis 20 %
Barton's Patent.....₱ doz $25—dis 20 %
Vaughn's " .....25—dis 10 %

Sad Irons.—Monitor Brand, Silver Polished....₱ lb 6c

Sash Weights.—Standard Solid Eyes.....₱ lb 3½c

Saws.—Disston's.....dis 5 %
Spear & Jackson's.....$5 00 to £ gold
Hubbard, Lippincott, B. & Co.'s.....dis 10 %
Branch, Crooks & Co.'s.....dis 10 %
Livingston's Patent Buck.....net list

Screws.—American Screw Co.'s revised list..dis 42½ %
$200 worth in 6 months.....2½ % extra

Scythes.—Blood's C. S. & G. S.....net list
Dunn Edge Tool Co.'s, Factory List.....dis 15 %
Paris Furnace Co.'s.....dis 20 %
Waldron's English.....$10 00 to £

Scythe Stones.—No. 1 Ind'n Pond ₱ gr's, $7 00
Extra Indian Pond....." 7 50 | dis 25 %
Premium....." 9 50 |
Diamond Grit....." 13 50

Shovels, Spades and Scoops.—Ames'..add $1 to list
Lippincott's.....new list net
Rowland's, Maxwell.....revised list net

Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₱ lb, 17c
Solid Cast Steel....." 35c
Striking Sledges.....₱ lb extra, 1c

Snaths and Cradles......dis 20 %

Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 5 %
Blue Seat Springs.....new list dis 10 %

Tacks.—Norway Tack Co.'s ¼ weight.....dis 67½ %
Brads.....dis 50 %

Traps.—Newhouse Patent.....dis 12½ %
Reichard's Animal, Wood Bottom.....₱ doz $10 00
" " Metal Bottom....." 12 00

Vises.—Solid Box.....₱ lb 18c
Wilson Mfg. Co.'s.....dis 15 %

Wrenches.—Coes' Genuine.....dis 40 %
Coes' Pattern.....dis 40 %
Taft's.....dis 50 %

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.
IC, 10x14, Charcoal...$14 50 | IX, 20x08, Terne.....$34 00
IX. 10x14, " ... 17 50 | IC, continuous, " .....
IC, 12x12, " ... 15 00 | 20 in. x 200 ft..... 27 00
IX, 12x12, " ... 18 00 | IX, continuous,
IC, 14x20, " ... 15 50 | 20 in. x 200 ft..... 34 00
IX, 14x20, " ... 18 50 | IC, 10x14, best Coke.. 13 50
IC, 14x20, Terne..... 14 00 | IC, 10x14, good " .. 13 00
IX, 14x20, " ..... 17 00 | IC, 10x20..... 21 00
IC, 20x28, " ..... 29 00 | IC, 14x20..... 13 50

Block Tin.
Large Pigs.....42c | Bars.....44c
Small " .....43c |

Sheet Zinc.
Casks.....₱ lb 11c | Sheet.....₱ lb 11½c

Solder.
No. 1, Refined, in bars or plate.....25c
No. 2, " " " 23c
Pig Lead.....8½c

Sheet Copper.—18 to 100 lbs. Sheets 30x60.....40c
14 to 16 lbs., Sheets 30x60.....42c
10 to 12 lbs., " and 30x72.....45c
6 to 9 lbs., " 48c

Tinned, 14 and 16 oz. 14x48.....38c
Planished, 14 and 16 oz. 14x48.....46c
" No. 7, 8 and 9.....48c
Copper Bottoms.....45c

Sheet Iron.—

| Com'n. | Sm'th. | Char'l. | Jun
No. 16 to 20..... | 6½c | 7½c | 8¾c |
No. 22 to 24..... | 6½c | 7½c | 8¾c |
No. 26..... | 6¾c | 7¾c | 9c | 11¼c
No. 27..... | 7c | 8c | 9¼c | 11½c

Galvanized Iron.....dis 20 %
Iron Rivets.....dis 15&20 %
Iron Wire.—.....dis 15 %
Coppered Pail Bail Wire.....dis 5 %
Copper Rivets and Burs.....dis 10 %
Russia Iron.—Nos. 9, 10, 11 and 12, ₱ lb.....21c
No. 1, stained, ₱ lb.....20c
Imitation Russia, ₱ lb.....15

DETROIT.

(Reported by Messrs. Jewett & Root.)

Tin Plate.—Best Charcoal
IC, 10x14.....$13 75
IX, 10x14.....16 50
XX, 10x14.....19 25
IC, 12x12.....14 25
IX, 12x12.....17 00
IC, 14x20.....14 75
IX, 14x20.....17 50
XX, 14x20.....20 25
XXX, 14x20.....23 00
XXXX, 14x20.....25 75
DC, 100 Plate.....13 25
DX, " 16 00
DXX, " 18 75
DXXX " 21 50
DXXXX 100 Plate..24 25
IX, 14x14.....25 25
IC, 10x14 W.....13 25
IX, 10x14 W.....16 00

Roofing Tin.—Best Char.
IC. Terne, 14x20.....$12 75
IX, " 14x20..... 15 50
IC. Terne, 20x28..... 27 00
IX, " 20x28..... 31 00

Coke Tin.—
IC, 10x14 Coke.....$12 75
IX, 10x14, Coke..... 15 50
IC, 14x20, " 13 75

Sheet Zinc.—Any width.....11c

Copper.—
Sheathing.....38c
Copper Bottoms.....40c

Planished Copper.—
Sheathing, 14x48.....46c
Boiler Size, No. 7.....48c
" " No. 8.....48c
" " No. 9.....48c

Pig Tin.—
Large Pigs.....40c
Small Pigs.....41c
Bars.....42c

Solder.—No. 1.....22 c
No. 2.....20c

Bright Wire......dis 25 %

Sheet Iron.—
No. 18 Am. Com.....6¼c
No. 24 Am. Com.....6½c
Pat. Am. Russia "A."
Nos. 24, 25 & 26.....11c
Russia No. 9, 10, 11 & 12..21½c
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth ₱ 1 25
" 21 to 24..... 7 45
" 25 & 26..... 7 65
" 21 to 24 Char'l.. 8 95
" 25 & 26 " 9 15

Sheet Iron Bread Pans.....₱ lb 13c
American Broilers.....₱ doz, $13 50
Tinmen's Machines.....net list
Sad Irons.....₱ lb, 5½c
Brass Kettles.—Ansonia.....48c
Wrought Iron Pipe.....dis 60 %

Inside Diameter, Inches.	⅛	¼	⅜	½	¾	1	1¼
Price, ₱ foot.....	·10	·10	·12	·13	·20	·29	·39
Weights of Pipe, ₱ foot.	·24	·42	·56	·85	1·12	1·67	2·25
Inside Diameter, Inches.	1½	2	2½	3	3½	4	
Price, ₱ foot.....	·50	·70	1·10	1·50	1·85	2·8	
Weights of Pipe, ₱ foot.	2·69	3·66	5·77	7·54	9·05	10·	

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers of Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$14 00 @ $15 00
I. C. 10x14 best Coke.....13 00 @ 14 00
I. C. Terne, 14-20.....12 50 @ 13 50
I. C. " 20-28.....26 00 @ 28 00
I. C. Continuous.....28 00

Pig Tin.—
Banca.....₱ lb 47c | Straits.....₱ lb 42c
| English.....42c @ 43c

Solder.—
S. & Co.....₱ lb 28c | A 1.....₱ lb 25c
| Roofing....." 24c

Lead.—Pig..₱ lb 7½c @ 8c. | Bar.....₱ lb 8c @ 9c

Copper.—
Ingot.....₱ lb 31c @ 33c | Brazier, 6 to 9 lb...₱ lb 46c
Planished..." 51c @ 53c | " 10 to 14 lb..." 43c
Sheathing.." 44c @ 46c | " 14 to 100 lb.." 40c
Bolt..... 40c | Copper Bottoms..." 45c

Zinc.—Cask, 500 to 1000 lbs.....₱ lb 11½c
Case, 100 lbs.....11¾c
Slab....." 8½c @ 9c

Brass.—
Roll, No. 6 to 30.₱ lb 45c | Roll, No. 38 to 40...₱ lb 58c
" 30 to 38. " 65c | Wire, No. 0 to 20..₱ lb 50c
| " 20 to 25..." 60c

Babbit Metal.— | Black Lead.....₱ lb 25c
Sellew & Co.....₱ lb 35c | Market....." 18c

Antimony.....₱ lb 22c
Bismuth.....₱ lb $6 00
Nickel.....₱ lb $3 50
Pig Iron.—

HOT BLAST CHARCOAL PIG.

Hanging Rock, No. 1.....$55 00 @ $
" " No. 2.....52 00 @ 53 00
" " Forge.....45 00 @ 46 00
Tennessee, No. 1.....54 00 @ 55 00
" Forge.....44 00 @ 45 00
Alabama, No. 1.....55 00 @
Missouri, No. 1.....55 00 @
" No. 2.....53 00 @ 54 00

HOT BLAST STONE COAL PIG.

Missouri, No. 1.....$55 00 @ $
" Forge.....43 00 @ 44 00
Ohio, No. 1.....53 00 @ 54 00
" Forge.....43 00 @ 44 00
Scotch Pig, No. 1.....

COAL BLAST CHARCOAL.

Hanging Rock, Car Wheel.....$62 00 @ $67 00
Missouri, Car Wheel.....60 00 @ 62 00
Red River, " .....60 00 @
Tennessee, " .....60 00 @ 62 00
Alabama, " .....60 00 @ 62 00
Blooms.....115 00 @ 120 00

Sheet Iron.— | Am Russia A..₱ lb 14 @ 15c
Russia.....₱ lb 20c @ 22c | B.." 13 @ 14c

Com. B.	Fin. S. L. U.	Smooth D. Re'fd.	Smooth
15 to 20.....	6·0c	7·5c	9·0c
22 to 24.....	6·2c	7·8c	9·2c
26.....	6·4c	8·0c	9·4c
27.....	6·6c	8·2c	9·6c

Galvanized Iron.—Full bundles.....dis 20 %
Nos. 18 to 20.....15c | No. 27.....18c
22 to 24.....16c | 28.....20c
25 to 26.....17c

Bar Steel.—Silver, ₱ lb 21c; Crescent, 17¼c.
Iron Wire.....dis 15 %
Enameled Ware.....dis 33⅓ %
One Piece Corrugated Elbows.—

Charcoal Iron.		Russia Iron.	
4½ inch.....	₱ doz $8·75	4½ inch.....	₱ doz $8·00
5 "	" 4·25	5 "	" 10·00
5½ "	" 5·25	5½ "	" 13·00
6 "	" 5·25	6 "	" 13·00
7 "	" 6·50	7 "	" 14·00

Leader Elbows—Flat Crimp Retinued.—

	₱ doz.		₱ doz.
2-inch.....	$2 00	2½-inch.....	$2 25
3-inch.....	2 50	3½-inch.....	3 00
4-inch.....	3 50	4½-inch.....	4 00

Sheet Iron Bread Pans.....₱ lb 13c
American Broilers.....₱ doz, $13·50
Tinmen's Machines.....net list
Sad Irons.....₱ lb, 5½c
Brass Kettles.—Ansonia.....48c
Wrought Iron Pipe.....dis 60 %

Inside Diameter, Inches.	⅛	¼	⅜	½	¾	1	1¼
Price, ₱ foot.....	·10	·10	·12	·13	·20	·29	·39
Weights of Pipe, ₱ foot.	·24	·42	·56	·85	1·12	1·67	2·25
Inside Diameter, Inches.	1½	2	2½	3	3½	4	
Price, ₱ foot.....	·50	·70	1·10	1·50	1·85	2·8	
Weights of Pipe, ₱ foot.	2·69	3·66	5·77	7·54	9·05	10·	

London Metal Market.

(From The Mining Journal.)

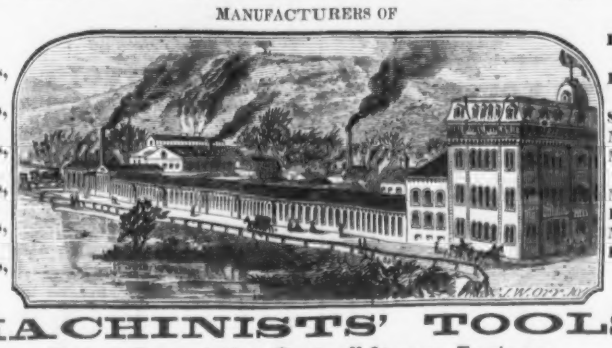
	£.	s.	d.	£.	s.	d.
Copper—₱ ton.						
Best Selected	96	0	0	100	0	0
Tough Cake & Tile	92	0	0	95	0	0
Sheathing and Sheets	98	0	0	105	0	0
Bolts	100	0	0	108	0	0
Bottoms	100	0	0	107	0	0
Old (Exchange)	94	0	0	—		
Burra Burra	90	0	0	91	0	0
Wire	₱ lb.	0	1	1½	—	
Tubes	"	0	1	0½	0	1	1
Brass—₱ lb.						
Sheets		0	0	10	0	0	10⅛
Wire		0	0	10¾	—		
Tubes		0	0	11⅛	0	0	11½
Yellow Metal Sheathing		0	0	9	0	0	9⅜
Sheets		0	0	8⅞	0	0	9¼
Tin—₱ ton.						
English Blocks	134	0	0	135	0	0
Ditto Bars	135	0	0	136	0	0
Ditto Refined	137	0	0	0	0	0
Banca	136	0	0	137	0	0
Straits	134	0	0	—		
Tin Plates—† ₱ box.						
IC Charcoal	1 qual.	2	2	0	2	5	0
IX "	1 qual.	2	8	0	2	11	0
IC "	2 qual.	1	18	0	2	2	0
IX "	2 qual.	2	3	0	2	8	0
IC Coke		1	14	0	1	16	0
IX "		2	0	0	2	2	0
Canada Plates	₱ ton.	24	10	0	26	0	0
"	at works	24	0	0	25	0	0
Spelter—₱ ton.						
Foreign		27	10	0	28	0	0
To arrive			—		—		
Zinc—₱ ton.						
In Sheets		33	0	0	38	10	0
Iron—₱

Machinery, &c.

Putnam Machine Company,

MANUFACTURERS OF

Engine Lathes, Iron Planers, Upright Drills, Traverse Drills, Milling Machines, Gear Cutters, &c.



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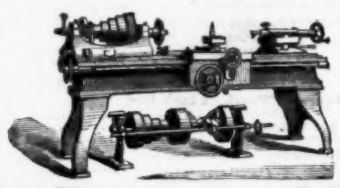

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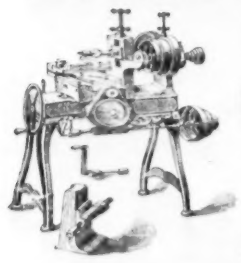

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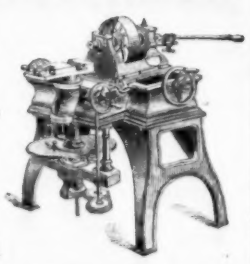

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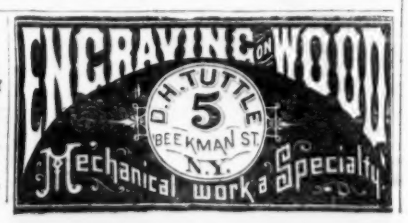

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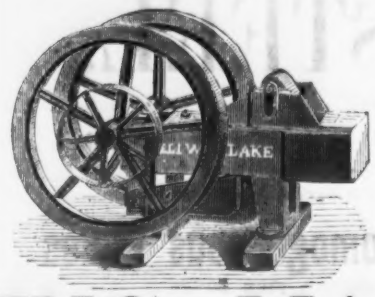

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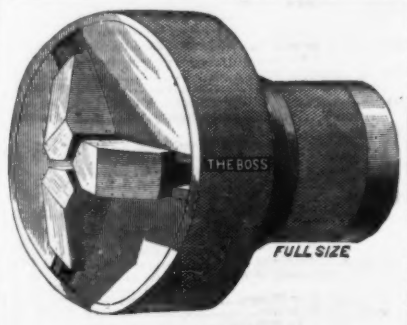

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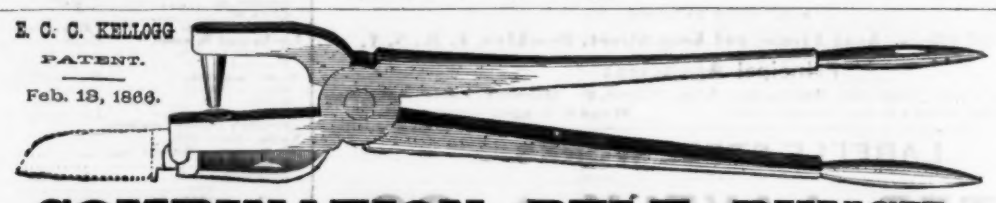

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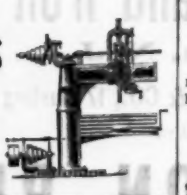

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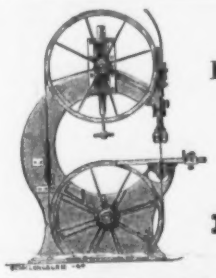

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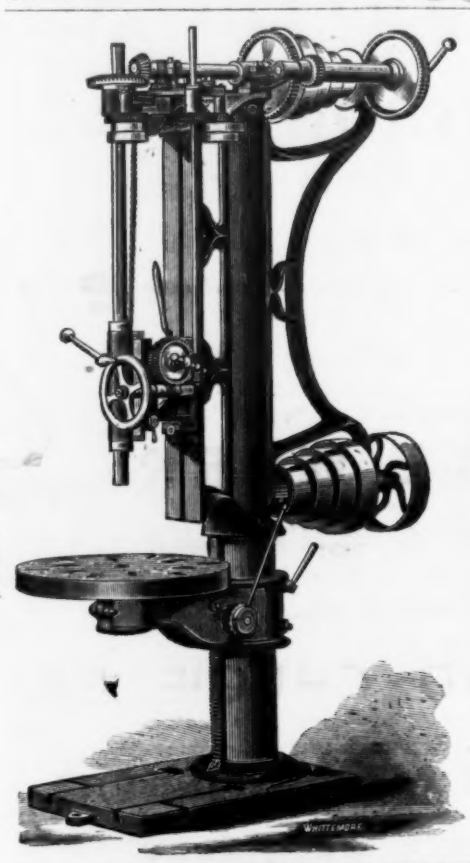

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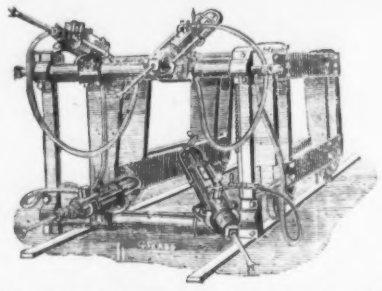

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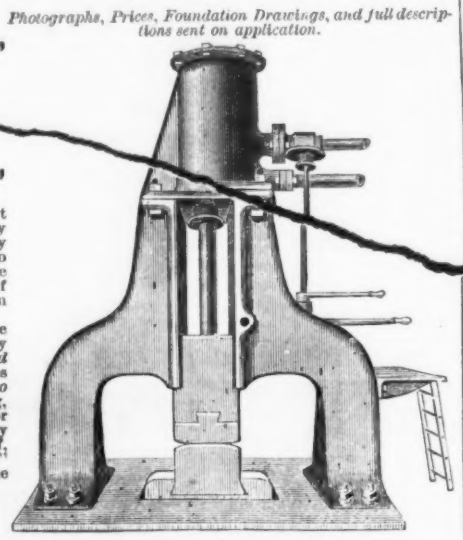

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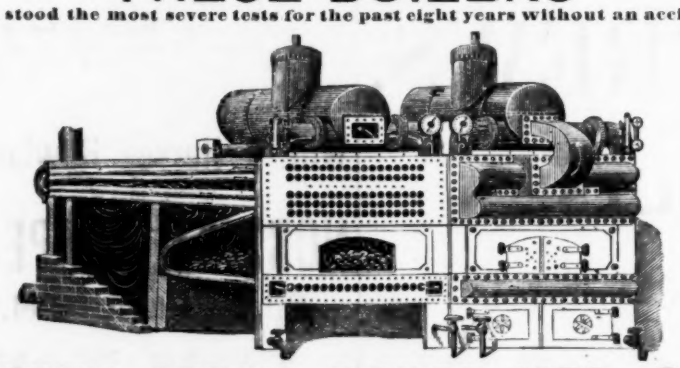

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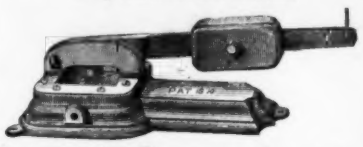

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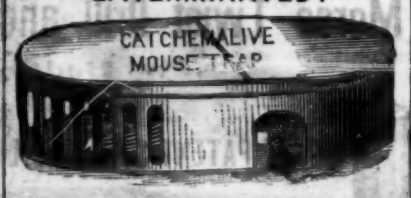

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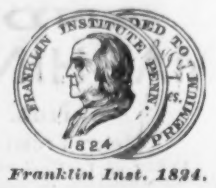
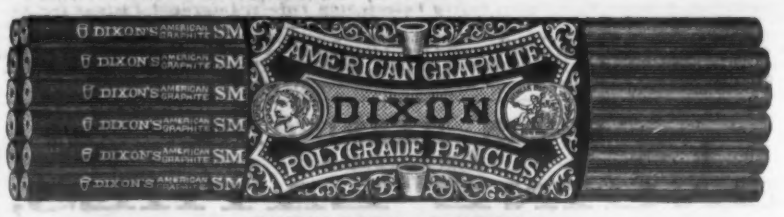


Franklin Inst. 1824.



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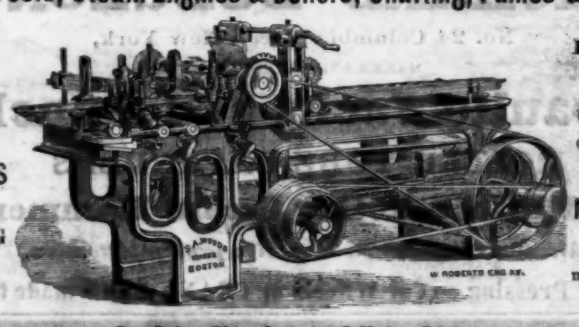

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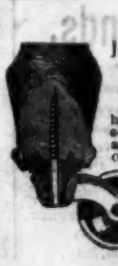

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